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THE EUSTACHIAN TUBES IN INFANTS AND YOUNG CHILDREN; ANATOMICAL DIFFERENCES AS COM- PARED WITH THE ADULT TYPE; BEARING UPON TYMPANIC DISEASE.

BY PHILIP D. KERRISON, M.D., NEW YORK.

Two facts must have impressed themselves upon all physicians in large practice amongst children, viz: (a) The greater prevalence of suppurative middle ear lesions in children as compared with adults; and (b) the greater difficulty in bringing about a complete and permanent cure. That is to say, there are many cases in which after the discharge has ceased, the drum-membrane remains congested, and slight causes induce recurrence.

It is in partial explanation of the above facts that I wish to refer to the anatomical characteristics of the Eustachian tube in infants and young children. In length, direction, the relation which its calibre bears to its length, and the relation of its pharyngeal orifice to the nasal floor, the eustachian canal of the infant at birth differs materially from that of the adult. Probably the simplest way of emphasizing these differences and their significance in tympanic disease, will be to give first a brief resumé of the distinguishing features of the adult tube, with which that of the infant may be compared.

The Eustachian tube of the adult varies in length from 33 to 38 mm. Of this about one-third, the tympanic end, is bony, and two-thirds, the pharyngeal end, is membrano-cartilaginous. It commences in the anterior wall of the tympanum, about 3 mm. above its floor, and passes forward, inward and downward to its pharyngeal termination in the lateral wall of the naso-pharynx. In passing from the tympanum to the pharynx, its course describes a rather marked declivity, its pharyngeal orifice being on a lower level by

12 to 14 mm. than the tympanic.¹ At the junction of the osseous and cartilaginous portions is the narrowest part of the tube where the average calibre is about $1\frac{1}{2}$ mm. At this point (the isthmus), the two portions of the tube form a slight (i. e., very obtuse) angle, opening downward. The pharyngeal orifice is situated at a variable distance behind the choanæ, and is on the average of 9 or 10 mm. above the level of the nasal floor. These relations are easily remembered if we bear in mind the fact that the floor of the tympanic cav-

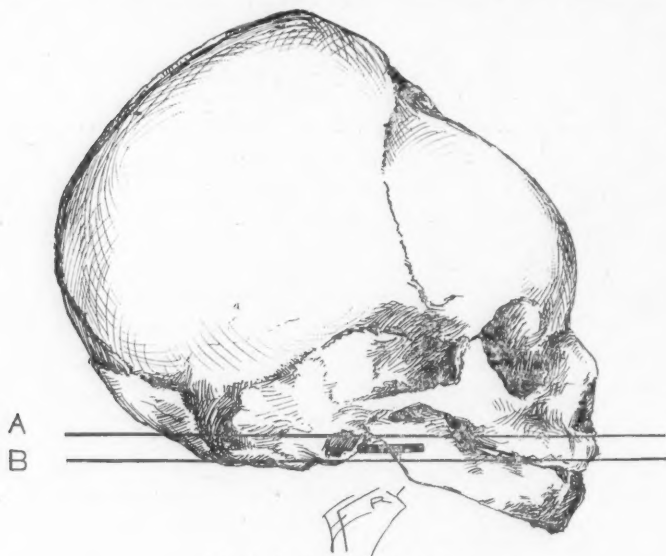


Fig. 1. Skull of Infant at Term.

ity is in the adult at least 20 to 22 mm. above the level of the floor of the nasal cavity, and that the pharyngeal orifice of the tube falls somewhere about midway between the two.

In the adult, then, the naso-pharynx communicates on either side with the corresponding middle ear cavity by a narrow canal, $\frac{1}{4}$ to $1\frac{1}{2}$ inches long, which commences at a variable distance behind the posterior nares, and 9 or 10 mm. above the level of the hard palate (nasal floor), and which reaches the tympanum by a considerable

1. The statement of Politzer, repeated by Bruchl, that the tympanic orifice is about 2.5 cm. higher than its pharyngeal opening is obviously incorrect, since with his estimated length of 34 to 36 mm., this difference in the level of its two extremities would bring the direction of the canal into a plane much nearer the vertical than it is known to occupy.

POLITZER. *Disease of Ear*, p. 38.
BRUEHL. *Atlas of Otology*, p. 37.

ascent. The length, position and direction of the adult tube are therefore in some degree favorable to the exclusion from the tympanum of pus or germ bearing fluids (secretions) entering the pharynx by way of the nose.

Relation of the tympanic and nasal floors in the infant at term. The main differences between the eustachian canal in the adult and in the infant are explained largely by the fact that while in the adult the floor of the tympanum is fully 20 to 22 mm. above the

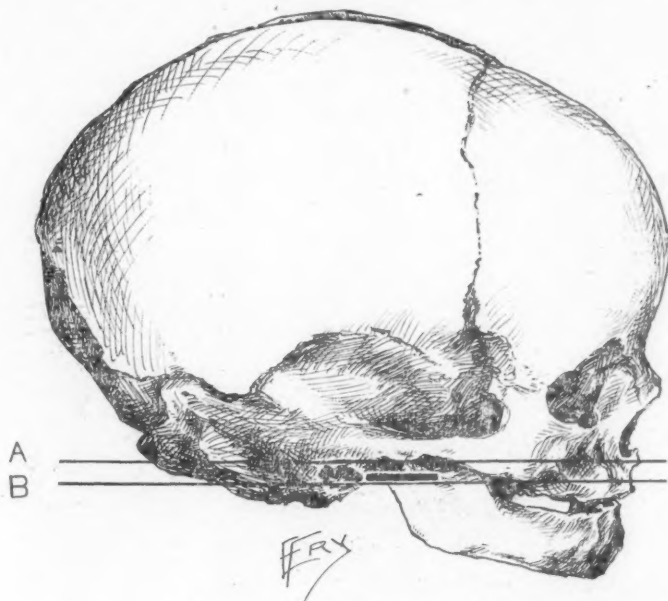


Fig. 2. Skull of Infant Three Months Old. *

floor of the nose, in the newly born infant it is on a level somewhat below that of the nasal floor (Figure 1). With the infant as with the adult, however, the tympanic mouth of the tube is somewhat above the tympanic floor; the direction of the tube is therefore nearly horizontal.

Anatomical differences between the Eustachian tubes of the infant and the adult. In the newly born infant the Eustachian canal presents the following marked variations from the adult type: (1) It is of course much shorter, measuring not more than 14 or 15

mm.² (33 to 38 mm. in the adult). (2) The tympanic orifice and the calibre of the bony tube are quite as large as in the adult. The whole canal in proportion to its length is therefore much wider. (3) The two portions of the tube (i. e. membranous and bony) are more nearly in the same straight line, so that there is no demonstrable angle at their point of junction. (4) The whole tube is nearly horizontal in direction, so that while the pharyngeal orifice in the adult is on a lower level by 12 to 14 mm. than the tympanic

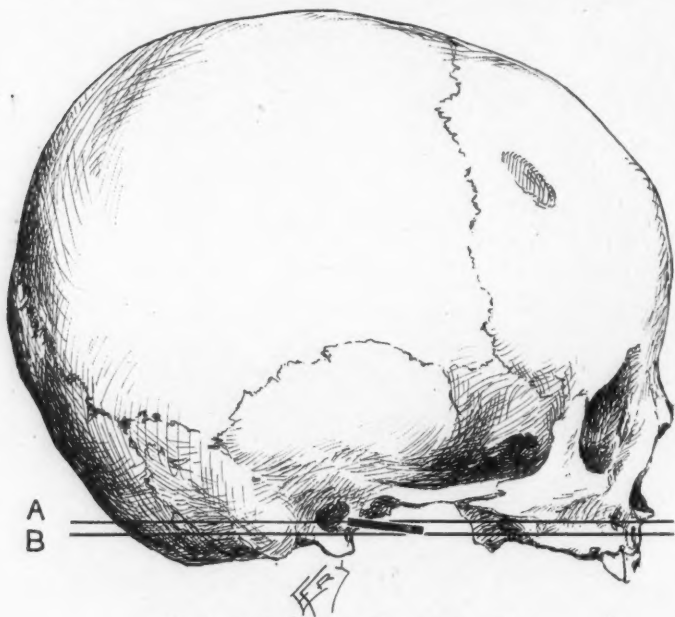


Fig. 3. Skull of Infant Seven Months Old.

orifice, it is on the same plane as the latter in the infant at term (Figure 1). (5) The pharyngeal mouth of the tube in the infant at term is on a level slightly below the hard palate; whereas in the adult it is some 10 mm. above the level of the hard palate. These above anatomical differences, while undergoing fairly rapid modification with the growth of the child, may be accepted as characterizing the tubal type in infancy as compared with the adult type.

2. Politzer's statement that the Eustachian Canal in the infant at birth is 18 to 20 mm. long seems hardly correct. Remembering that the infant tube is nearly or quite horizontal in direction, examination of the base of the skull of a foetus at term seems to demonstrate clearly that the entire canal cannot at this period exceed 14 or 15 mm. in length.

It would be a comparatively simple though tedious matter, were the material at hand, to make a series of longitudinal sections through eustachian canals representing different ages. Drawings from such specimens would lose value from their failure to demonstrate relations to important structures necessarily removed. In the accompanying drawings, the lines are accurately reproduced from skulls of different ages. They give accurately the comparative levels of the tympanic and nasal floors; and approximately the

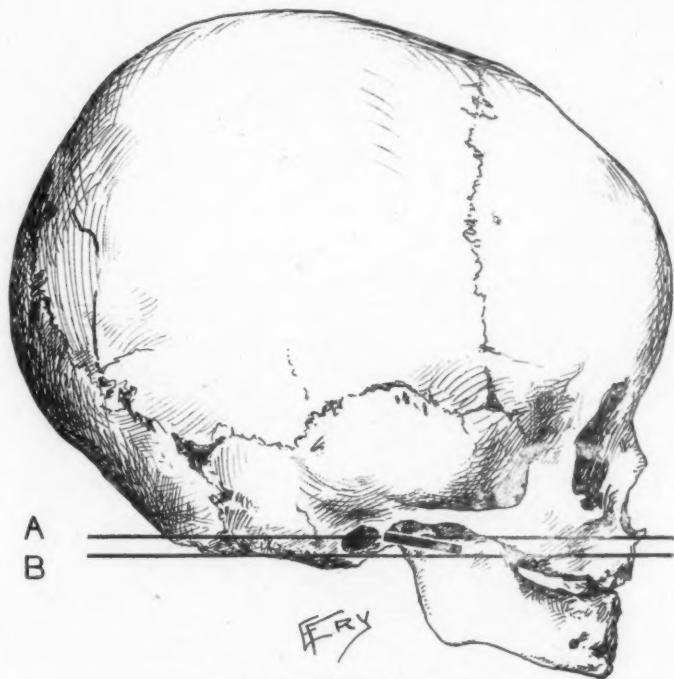


Fig. 4. Skull of Infant Fifteen Months Old.

direction—i. e. in relation to the horizontal plane—of the eustachian canals. The lines representing the eustachian tubes take no account of the varying directions of the membranous and osseous portions; they indicate merely straight lines passing through the tympanic and the pharyngeal orifices of the tube. They illustrate much more graphically than could any drawings from a dissection of the part the essential differences between the infant and adult tubes. To

the writer they seem also to throw considerable light on the predisposition of the first years of life to middle ear disease.

To epitomize: We find in the newly born infant a short, relatively wide, horizontal canal, the pharyngeal orifice of which lies a little behind the coanæ and on a level slightly below that of the hard palate. Its physical peculiarities seem, therefore, rather favorable to the entrance of germs either from the current of inspired air, or from the nasal secretions draining posteriorly into the pharynx.

Influence of adenoids upon the tympanic disease. When to this peculiarly open pathway there is added a mass of vascular lymphoid

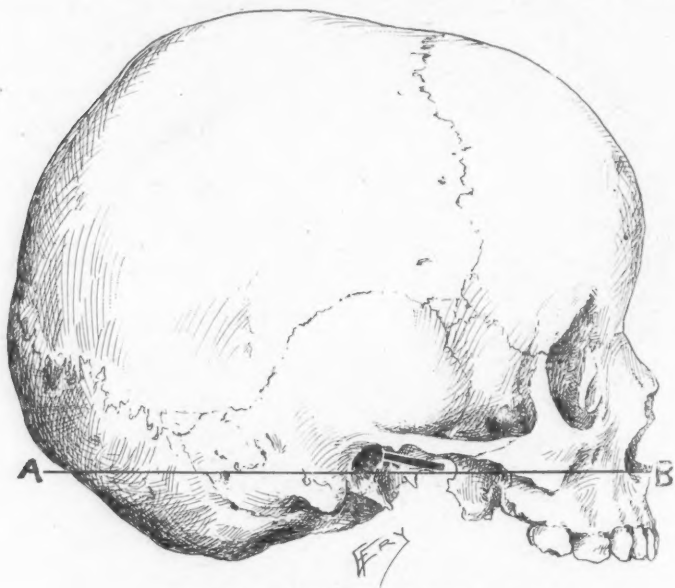


Fig. 5. Skull of Child Two Years Old.

tissue, receiving and holding innumerable bacteria; subject to variations in bulk under any conditions causing naso-pharyngeal congestion, the danger of tympanic infection is greatly increased. This brings us to a mooted point in the management of such cases, viz.: the question of removing adenoids in patients suffering from acute purulent otitis media. Personally, I am inclined to believe that when a pharyngeal growth is clearly a factor in acute tympanic disease, the removal of the growth and the incision of the drum-

membranes should be done at the same time. This does not mean that in every case of acute otitis media we should search the nasopharynx for evidences of lymphoid hypertrophy, but simply that when such a growth is clearly a hindrance to tympanic resolution, the acute stage of a tympanic inflammation offers a favorable time



Fig. 6. Skull of Adult.

for its removal rather than a contraindication thereto. In support of this view may be cited the following facts:

(1) The operation of adenectomy involves some risks to healthy ears. It seems wiser, therefore, to operate during the acute stage of an existing otitis media when the ears can be safe-guarded by free incision of the drum-membranes, rather than wait and incur the risk of recurrence as a result of a delayed operation.

(2) The free abstraction of blood from the pharynx which always occurs during adenectomy usually relieves tubal congestion and hastens tympanic resolution.

(3) With a pharyngeal growth sufficiently large to perpetuate naso-pharyngeal congestion, recovery from acute tympanic disease is apt to be slow, and not in the final outcome complete.

(4) In the experience of every aurist, there are certain cases of acute otitis media in which all therapeutic measures fail until the naso-pharynx is cleared of adenoid tissue. Delay in such cases means added risks.

(5) Either myringotomy or adenectomy should be done with the patient under a general anæsthetic. Combining the two operations obviates the necessity of repeated anæsthetization.

Explanatory Note.—In the accompanying illustrations, the line A represents the level of the nasal floor, and B the level of the tympanic cavity. In Figures 1, 2, 3 and 4, representing skulls of infants at term, at 3 months, 7 months and 15 months, respectively, the floor of the tympanum is on the level below that of the nose. In Figure 5, drawn from a skull of two years' growth, the nasal and tympanic floors fall in the same horizontal plane, line A-B. In Figure VI., from an adult skull, the tympanic floor, (B) is 24 mm. above the level of the nasal floor, (A). In each of these illustrations a heavy black line represents the Eustachian tube, showing approximately its direction in relation to the horizontal plane and to the level of the nasal floor.

58 W. 56th St.

**A REVIEW OF THE METHODS IN USE FOR THE REMOVAL
OF ADENOIDS, WITH THE DESCRIPTION OF A METHOD
WHICH IS THOROUGH, RAPID AND SAFE.***

BY GEORGE L. RICHARDS, M. D., FALL RIVER, MASS.

The tissue to which the term "adenoid" is usually applied is a soft, lymphoid mass lying in the vault and posterior wall of the naso-pharynx, and somewhat, though to a lesser extent, in the fossae of Rosenmüller, posterior to the Eustachian tube openings. It is an overgrowth of normal glandular tissue, designed to moisten this region, as well as help in the moistening of the inspired air. The adenoid becomes pathological on account of its size and its resultant interference with nasal respiration, face and jaw development, and proper aeration of the middle ear through its proximity to the Eustachian tube openings. It is also liable to acute and chronic inflammation and to tubercular infection. Hence its need of removal when so enlarged, or diseased.

What of the technique of the operation? While the need of the operation is well nigh universally recognized, and it is being largely performed by physicians of experience and without, its technique as usually performed seems to be very crude and not to have kept pace with the general advance of rhinology. Hence I bring the subject before you for further discussion, even though it may be thought that there is nothing new to say about adenoids, since this Association is to a large extent a teaching body and should help mould the thought of the profession so far as rhinology is concerned. The operations have been done rather blindly in a cavity where vision was impossible. The instruments have been mostly patterned after two models, though with many variations. First, some form of ring knife or curette which, when very sharp and skillfully used, will remove the growth, but when dull, as most frequently has been the case, since these are hard to keep sharp, only imperfect removal of the growth is attained, while, at the same time it tears the submucous tissue, leaving adhesive bands. These instruments are variously named, one instrument maker showing in his catalog twelve types. The curette of Gottstein or one somewhat like it has been the most popular. I am sure that anyone who has operated

* Read before the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D. C., May 7, 8 and 9, 1907.

much with this type of instrument, if he has had opportunity to re-examine some of the cases some years afterwards, must have found, occasionally at least, adhesive bands, to say nothing of possible injury to the Eustachian tube. Dr. Bliss, in a paper before this Association in 1898, made substantially the same statement, saying that apparent recurrence was probably due to cicatricial contraction after either incomplete removal or possible injury to the parts by the use of the curette.

In a paper read before this Association last year, "Removal of Adenoids Through the Nose," by Dr. Freer, he states very succinctly one of the disadvantages of the ring knife, "Its blade does not cut in the manner of a knife by slicing, as it is drawn through the tissues, but its edge impinges squarely against the material to be removed, with no sliding motion, so that there is a tendency to scrape over the adenoid masses rather than to cut them off, especially when they are freely movable and the vault of the pharynx is concave laterally so that the edge of the knife does not fit flatly against it." "A certain type of adenoid growth often encountered by me is also unfavorable for the ring-knife. I refer to the tough, firm, fibrous enlargement of the pharyngeal tonsil found in some children and often in adolescents and young adults. The blade is apt to slide over such masses without cutting away more than a small portion of them."

All these objections, as will be seen later, will be obviated by the method which I am about to describe.

The other type of instrument is some kind of cutting forceps of the so-called Löwenberg design, with its many modifications, some with blades that meet and some with invaginating blades, which removes the adenoid piece-meal, with as much more tissue as suits the fancy or lack of skill of the individual operator. No longer ago than 1906, in one of the largest and best-equipped clinics of this country, I saw an operator take a large Brandegee forceps, which is a modification of the Löwenberg, (an instrument which I have used and gave up many years ago) and after first bringing out a little adenoid, kept on until the third introduction brought mucous membrane and the fourth brought away unmistakable muscular tissue, when he announced that everything was out. It seems desirable to remove the adenoid, and this only, with as little destruction to the normal functioning of the region as is possible, so as not to condemn the little patient to a future permanently dry naso-pharynx.

In this connection I think we have dwelt unnecessarily much on the necessity of cleaning out the fossae of Rosenmüller on account of its effect on the ear. The main portion of every adenoid is central, and if that is removed, the little that remains in the fossae of Rosenmüller will not be of much account, and it is preferable to leave it rather than destroy the mouth of each Eustachian tube in the process of removal. Dr. Gradle, in a paper published in the *Medical News*, December 19, 1903, says: "Undue stress, it seems to me, has been laid on the extension of adenoids into Rosenmüller's fossae. Ordinarily the base of the growth does not extend quite so far laterally, though soft vegetations sometimes spread out along the surface. In rare instances lymphoid tissue really fills the fossae after the tonsil has been removed. This can only be taken away with a small curette, provided irritation of any kind indicates its removal. Large wing-like masses of lymphoid tissue which in rare instances descend from the fossae to below the level of the soft palate, I have found to be infiltrated reduplications of mucous membrane independent of adenoids proper, as they occur sometimes without the latter." As a matter of fact, the little that is in the fossae of Rosenmüller can usually be removed by careful manipulation with the small ring knife or a very small forcep of the original Hooper pattern, or even crushed by the tip of the finger itself. The eustachian tube lies quite a little distance in front of the posterior wall, on the side wall, projecting somewhat into the naso-pharyngeal space, and is affected by the adenoid by mechanical pressure or by reason of the general congestion which results from the adenoid. The tube mouth is cartilaginous and the adenoid does not of itself invade it. What adenoid is attached to the tube at all is on mucous membrane of the posterior and lateral surface of the posterior lip. I have paid particular attention for the last two years to this point, and while there is no doubt but that the Rosenmüller fossae frequently does contain some hypertrophied tissue, I think the importance of removing every last vestige of this has been overestimated, to the great danger of injury to the surrounding structures, and of producing more adhesions than one removes.

Various types of curettes, snares and forceps have been devised for the removal of adenoids through the nose, and have been enthusiastically recommended. A consideration of the anatomical relationships would seem to me to contra-indicate operations through this avenue.

The ideal operation is one which removes the adenoid tissue most thoroughly and rapidly and with the least traumatism, hemorrhage

and general shock. This is fulfilled more certainly so far as the instrument is concerned, by the adenotome of Schütz or some of its modifications, the detailed technique of which I shall describe. This instrument is on the principle of the old tonsillotome, cuts with a curved knife, and leaves a smooth surface, permitting rapid healing.

It was first described before this Association in 1897 by Dr. Farlow, who brought it home from Europe and had Codman and Shurtleff make up some from his model. The instrument, variously modified like other surgical instruments to suit individual tastes, especially by Gradle of Chicago and Schadle of St. Paul, has been used ever since. Hence I claim nothing whatever of originality. I am only trying to popularize its use. It consists of a sliding blade in a sheath, made to fit the naso-pharynx, and of varying sizes and widths, three sizes being needed.

Dr. Farlow first used it on young adults and without anesthesia. The first instruments as made by Codman and Shurtleff were rather



too long from above downwards for use in children, so that, like Dr. Farlow, for several years I used it only for young adults, without anesthesia, and so recommended it in two publications. It seems never to have become popular, however, judging from reports from surgical instrument houses, and in all the transactions of the American Laryngological Association from that date (1897) to this, I find no reference to it except in one instance by Dr. Farlow himself. If other members of the society have used it, it does not appear in the Transactions. The second notice by Dr. Farlow is in the Transactions of 1899, when he presented a large adenoid removed with the Schütz instrument. In general laryngological literature (American), I find but few references to this method: Gradle, in publications in 1901, his text book in 1902, and in a paper in 1903, strongly recommends its use. Schadle of St. Paul modified the instrument on the principle of the McKenzie tonsillotome, and I think described it in an article. Farlow previously referred to, my paper in Transactions of the American Medical Asso-

ciation, 1902, and my book on the Nose and Throat, 1903, page 193, are the only references I have found. I have looked up several text books, some more recent, but find no mention of the method. No doubt there are other references, but I have not happened to find them. Since procuring an improved type of instrument, made by Kny Scheeres Co., I have used it in nearly all cases with the greatest satisfaction. There are three sizes of the instrument, with cutting blades 13, 16 and 19 mm. in diam., and superior inferior distance 23, 25 and 26 mm., and they can be chosen with regard to the age and size of the child's naso-pharynx, a good plan being to have the middle and smallest size instruments always at hand. There are but few naso-pharynges where one size or the other cannot be used. I have so far met with none. The instrument is probably not of universal application; few procedures are.

As used on young children, the technique is as follows: The child being under anesthesia and held in the arms of a nurse, with a properly curved palate hook, a good view of the location of the adenoid can be obtained. (Anesthesia is not absolutely necessary, but is certainly to be preferred.) The growth is then palpated with the finger, and if it comes in contact with the postero-superior border of the choanae, it is shoved back sufficiently with the finger so that the upper edge of the instrument will not hit this portion of the adenoid, and therefore the knife fail to cut it. A little side dissection of the growth with the finger toward the center from the Eustachian tube mouths also aids in getting the growth within the fenestrum. The instrument is then pushed firmly back against the naso-pharynx, that is, sufficiently high and sufficiently posteriorly, and the knife made to cut through, the growth comes out in one piece, and the hemorrhage is not any more excessive than with the Gottstein curette, and usually ceases more promptly. The finger is next used for examination, when it is frequently found that there is a little lying in the lower cavity of the naso-pharynx, just above the atlas-axis articulation. The adenotome is again inserted, pressed firmly down into this cavity, the cut made, and the adenoid removed. Examination with the finger in most cases in young children will show everything perfectly clear. The finger is next carried up behind each Eustachian tube and the Rosenmüller fossae, and the adenoid, if any is there, is crushed out with the finger. As this in no way interferes with respiration, the finger is usually all that is necessary. If there is considerable there, it can be removed with a very small Löwenberg or Hooper forcep, or a small ring knife,

under the guidance of the finger. In a large proportion of the cases this is not at all necessary. The hemorrhage is staunched in the usual way and the operation is over. Examination with the finger a few weeks later shows a perfectly smooth, normal naso-pharynx as the result of the operation. No adhesive bands—no tearing of tissue. If, after the first cut, there seems to be some side pieces left, as is now and then the case, particularly with adults, the introduction of the smaller size instrument pushed firmly back and against the side wall, will remove these little tabs. Here care has to be taken in regard to the Eustachian tube to push the instrument far enough backwards before sliding laterally, as in Eustachian tubes with very large posterior lips it is possible to cut this lip with the blade. In one instance in my experience this was done. No result followed as it was simply the cutting off of a little cartilage. There was no earache, loss of hearing or any injury whatever, as there was no tearing or pulling of the tissue on the Eustachian tube. Should there be a little adenoid left directly back of the vomer, an ordinary Beckmann or some modification of the Gottstein curette will remove it, and I always carry these and the smaller forcep of the Löwenberg type in my armamentarium. As a rule, though, I do not use them.

In young adults and older children, I have used a palate retractor first suggested to me by Dr. J. E. Schadle of St. Paul, Minn., This consists of a piece of tape twenty-four inches long, the ends of which for six inches are twisted and then coated with paste and dried. One end is passed through each nostril to the naso-pharynx, grasped with a forcep and drawn out through the mouth, where it is held by nurse or patient. The traction draws the palate well forward and allows the instrument to be easily inserted. Here cocaine through the nose and by way of the mouth answers for anesthesia. The left forefinger, guarded with a sterile finger cot, is used for all examinations. As large an instrument as can be comfortably inserted is used. The first cut is made in the center, then if any side tabs be left, used sideways, first right and then left. The finger is then used, the small depression above the atlas examined, and the pad remaining, if any, then cut out. No further examinations are made.

Complications.—In one instance I have had earache; in one secondary hemorrhage six days later. Neither was of any particular account, and could have happened with any method, in fact, earache after operation is less common than when I used the curette.

Cautions.—Always use as large an instrument as the nasopharynx will comfortably take. Owing to its slenderness, the knife is occasionally broken (the Gottstein also occasionally breaks; numerous such instances have been reported), usually in the taking apart or putting together of the instrument, in both of which operations care must be taken. The blade should be kept sharp. A small cone slip of Arkansas oil stone is needed for this. The knife should slide freely.

Compare this with the bloody operation as shown in some text books, child on the back, head hanging over the table, anatomical landmarks all reversed, and I cannot conceive how one who has tried the method I have described sufficiently to become somewhat expert at it can ever go back to the older methods.

REFERENCES.

DR. OTTO T. FREER, Transactions American Laryngological Association, 1906.

DR. HENRY GRADLE, Text-book, 1902.

Post-nasal forceps, cutting laterally, designed by Jonathan Wright, Trans. A. L. A., page 113, 1892.

Schütz adenotome, described in detail with cuts by Dr. J. W. Farlow, Trans. A. L. A., 1897. At this time Dr. Farlow stated that he had used it generally with young adults, and with anesthesia. I first used it on the recommendation of Dr. Farlow, he having written me a personal letter in regard to it. These instruments were made by Codman & Shurtleff, and were rather too long from above downward for use in children. For several years I used it only for young adults and with anesthesia.

Paper on the recurrence of naso-pharyngeal adenoids, Arthur A. Bliss, Trans. A. L. A., 1898, page 89. Apparent recurrence probably due to cicatricial contractions after either incomplete removal or considerable injury to the parts by the use of the curette.

Personal Methods for the Operative Treatment of Pharyngeal Adenoids, D. Bryson Delavan, Trans. A. L. A., 1898, page 94. Instruments referred to, ring knives, sharp spoon, Gottstein instrument, finger nail, Lowenberg forcep, modifications of Gleitsmann and Hooper wire snare or loop adenotome. Gottstein's knife most popular but incomplete. Goes through the lower part of the growth only. May leave one side full, the other empty, or fairly clears the vault and leaves abundant deposits on the posterior and lateral pharyngeal wall. Forceps and adenotomes to be used on adults only, and not on children. In the discussion Dr. Farlow referred to the Schütz pharynx tonsillotome; not mentioned by anyone else.

Trans. A. L. A., 1899, Dr. Farlow presented a large adenoid removed with the Schütz instrument. Same year, page 216, Dr. French presented a modification of the Lowenberg cutting forceps for the removal of adenoids. 1904, Dr. French showed another modification in which the cutting edges were as sharp as scissors. I find no other reference.

THE LARYNGOSCOPE, 1900, Dr. Martin of San Francisco showed an antero-posterior cutting forceps modeled somewhat on the lines of a Gottstein curette, which he had used with satisfaction.

Gradle, Pathology of the Pharyngeal Tonsil, with Observations on its Removal, THE LARYNGOSCOPE, 1901. This is a modification of the adenotome of Schütz, made of such size and shape as to fit closely every pharynx beyond about the fourth year of life. In younger children a somewhat smaller model is used. Firm pressure guarantees the removal of the entire tonsil in one piece. On the basis of the experience of 60 operations as compared with some 800 done in different methods, he states that the adenotome will in every instance remove the entire tonsil in one sweep. It is only when a timid operator does not press sufficiently that any adenoid tissue is left. The hemorrhage is just as sharp as with any other mode of operating, but does not last as long.

THE LARYNGOSCOPE, 1901, page 67, Wm. F. Clevenger, of Indianapolis, presents a cutting forceps for operating in the post-nasal space, modified Lowenberg.

Adenoids from the Standpoint of Hemorrhage, Kimball, Trans. A. L. R. O., 1900, page 128, curette preferred, Lowenberg's forceps or Hooper's modification referred to.

Is the Adenoid Operation a Justifiable Surgical Procedure, Geo. L. Richards, A. M. A., 1902, page 40. In a paper read before the A. M. A. at the Saratoga meeting in 1902, entitled "Is the Adenoid Operation a Justifiable Surgical Procedure?" I referred to various methods for removal of adenoids which I had seen in various clinics, and referred to the various methods in use, mentioning the Schütz adenotome, and referring to my own experience in its use, saying at that time that I did not think it adapted for very young children, preferring in them general anesthesia and the ordinary instruments. At that time I had not anything but the original Schütz instrument as made by Codman & Shurtleff, not the improved model I now use.

In a paper by Dr. Freer, *Journal A. M. A.*, Nov. 24, 1900, he refers to the use of the Ingals nasal bone forceps as necessary to complete any operation, and the type which he recommended at that time is that done with the Lowenberg forceps. Adenotomes, he says, need but be mentioned, as they cannot possibly fit every pharynx and can do serious injury on account of their great strength. They should be confined to adults and those children where a circumscribed growth can be accurately located. See also *Annals of Otology*, Dec., 1906.

Dr. Holmes, THE LARYNGOSCOPE, May, 1905, in an article on the proper position for the removal of adenoids, refers to the use of the Gottstein curette or some modification of that instrument, which is probably his favorite instrument, and his operations he does on the side.

Dr. Gradle has a further paper in the *Medical News*, December 19, 1903, having used the Schütz instrument in 250 operations, says that as often as he has reinserted the instrument a second time, he has often failed to bring away any more remnant, provided he pressed firmly enough in the first instance. Examination after healing shows occasionally a small fringe of adenoid tissue next to the upper rim of the choanae. These remnants were of sufficient size to demand a second operation but twice in over 200 cases. I find that where that is the case, the use of the ordinary Beckman curette disposes of them at the time of the original operation.

THE LARYNGOSCOPE, May, 1901, Holmes reported two accidents from the breaking of the ordinary Gottstein or modification of it.

Hueber, *Archives of Pediatrics*, March, 1901, if, after a few weeks, it is found that all the growths have not been removed, a second curetting can be done. (Comment superfluous.)

Jarecky for adenoids in very young infants, had an oval curette constructed. It must be admitted that no type of the Schütz instrument could be used in children of a few months old.

Observations on 1000 Adenoid Operations, Frank B. Sprague. Reference to the mesh of cicatricial bands resulting from the tearing of the growth with the finger nail, and one case where the fascia and muscle tissue had been torn from the posterior lateral wall of the pharynx leaving a bad deformity, but the adenoids were still present. He operates with forceps after the Hooper pattern, but a little larger, repeatedly introducing the forceps until all redundant growth is removed, being careful to protect the muscle and fascia from injury. He uses the finger nail for any mass which may be in the fossae of Rosenmüller, and he considers it of the greatest importance to carefully clear the fossae of Rosenmüller; otherwise a safe condition of the ears and good hearing cannot be assured. Care must be taken not to injure the tubercle of the atlas.

(Comment—Before using any instrument, the growth should be oriented sufficiently with the finger to know whether one has a prominent atlas or not. The base of the Schütz instrument is usually above any such prominent atlas.)

84 N. Main St.

The Examination of Hearing in School. M. MALHERBE ET
STACKLER. *Bull. Med. No. 23.* 1906.

The authors base their conclusions on the examination of 588 scholars. They claim that examination for deafness in scholars should be compulsory, the results reported to the teachers so as to guide them in the instruction of the scholar.

The report should also be made to the parents, as it is of utmost importance for the future of the child, not only for its health, but also for a choice of profession.

SCHEPPEGRELL.

**CASE OF EXTRA-DURAL ABSCESS. SEPTIC THROMBOSIS
OF THE LATERAL SINUS, COMPLICATED BY
PREGNANCY. OPERATION, WITH RECOVERY.**

BY GEORGE L. TOBEY, JR., M.D., BOSTON.

On August 10th, I was called by Dr. J. Goodwin of Clinton to see the following case: An Italian woman, twenty-three years old, married, and seven months pregnant.

May 6th. three months previous, she had been admitted to the Clinton Hospital with a profuse suppuration of the right middle ear and marked tenderness, with oedema over the mastoid. Slight jaundice. Temperature 100°. There was no blood count. The patient refused to submit to mastoid operation and was discharged "Unimproved—against advice" on May 7th.

August 9th. she was readmitted with the following history: After leaving hospital, the discharge from the ear, varying in consistency and amount, continued till three weeks ago, since which time the ear has been dry. The tenderness over the mastoid has persisted to date, but pain has not incapacitated patient for work, that of keeping house. Ten days ago, the oedema over mastoid began to rapidly increase and the tenderness became more marked. There has been no vomiting nor chills. Slight dizziness for two days. Severe occipital headache two or three days.

Physical examination showed a well-developed woman, fairly nourished. Heart and lungs normal. Eight months pregnant. Urine negative. On the right side of the head there was a prominent swelling extending from a point $1\frac{1}{2}$ -2 cm. posterior to auricle to the occipital protuberance, and from a point 1 cm. from the median line to a level corresponding to the tip of the mastoid process. This swelling was firm and no signs of pain were elicited on pressure.

Over the mastoid bone itself there was very slight oedema and tenderness was elicited on deep pressure only. There was marked sagging of the posterior and superior canal walls. The membrana tympani, pale pink in color, was slightly oedematous, although the landmarks were readily made out. There was no perforation. Spoken voice heard at four feet. Blood count showed 14,300 leucocytes. Temperature 99.8. Pulse 120. Respiration 20.

OPERATION.—Ether. An incision started just above auricle and $\frac{1}{2}$ cm. posterior thereto was carried downward and backward to the tip of the mastoid process. The periosteum when elevated showed the cortex white and firm. The sclerosed cortex was removed with chisel and mallet. The cells were found to be diploetic in character and filled with foul creamy pus. The antrum was opened with gouge and curette. The diploetic cells, all of which contained pus and granulations, were found to extend for 2 cm. above the temporal ridge in the squama and for $1\frac{1}{2}$ cm. forward in the zygomatic process.

It was found necessary to enlarge the wound, and a posterior incision was made at right angles to the original on a plane passing through the middle of the external auditory canal. This incision was made through the swollen area, in which was apparently a very marked venous stasis, as the tissues were engorged with dark venous blood. The periosteum when elevated showed no apparent superficial osteomyelitis.

The bone cavity was enlarged. Broken-down diploetic cells extended for 1 cm. posterior to sinus; beyond this point the bone was apparently healthy.

When the lateral sinus was exposed, its walls were apparently normal except over a small area high up, which was dark and granular. The tegmen antri et mastoidei were found to be soft and necrotic, and their removal evacuated about one drachm of foul greenish pus from the middle fossa. The dura was dark, soft and granular at this point, but no perforation of the dura was found.

The tip of the mastoid was not removed.

The horizontal incision was partially closed with silkworm sutures and the wound packed with iodoform gauze. The membrana tympani was incised and a small wick placed in the external auditory canal.

Good recovery from ether.

August 11—Patient comfortable. No pain. Temperature 97.7° . Pulse 104.

August 12—Temperature 98.4° . Pulse 89. Outer dressing changed; posterior wound apparently clean. Slight moisture in the canal; small amount of boric acid insufflated.

August 15—Middle ear dry. Packing removed from the mastoid wound. The cavity was clean and repacked lightly with iodoform gauze.

August 17—Mastoid clean and granulating well. Oedema persists.

August 20—During the last twenty-four hours patient has complained of severe frontal and occipital pain, requiring morphia. Temperature 99.2°. Patient mentally clear. No dizziness nor nausea.

August 22—At 9 a. m., the wound was dressed and found to be clean and granulating well. During last night the patient complained of severe abdominal pain. Vomited several times during the forenoon and labor-pains continued with increasing severity during a. m. Patient delivered at 12:05 p. m. of a premature (dead) child.

August 23—Temperature normal. Complains of headache. Lochia normal. Vulva pads changed s. o. s.

August 24—Morning temperature normal; evening temperature 102.4°. Complained of severe headache during the day. Breasts full, red, and painful. Lochia normal, wound clean. Breasts pumped; epsom salts.

Blood—Whites 20,300.

Poly. m. n. leucocytes.....	69%
Small lymph.....	16%
Large lymph.....	12%
Eosinophiles	3%

August 25—The temperature is irregular. Complains of pain and soreness of breasts. Breast pump used every four hours. Lochia normal.

August 26—Temperature varies from normal to 102.8°. Severe headaches.

August 28—The septic temperature continues. There have been no chills nor chilly sensations. Heart and lungs normal. Eyes normal. Lochia normal. Breasts red, full, and tender. Severe headache. Patient drowsy. Mastoid wound filling with firm healthy granulations. On deep pressure below the tip of the mastoid there was no tenderness, but a small drop of pus appeared in the mastoid cavity 1½ cm. above the tip and midway between the sinus and posterior canal wall. A small middle ear probe was passed into a minute sinus leading in direction of the jugular bulb. There is no diminution in the swelling which was present at the time of entrance to the hospital. Blood count showed 14,900 whites with 68% of the polymorphia-nuclear leucocytes.

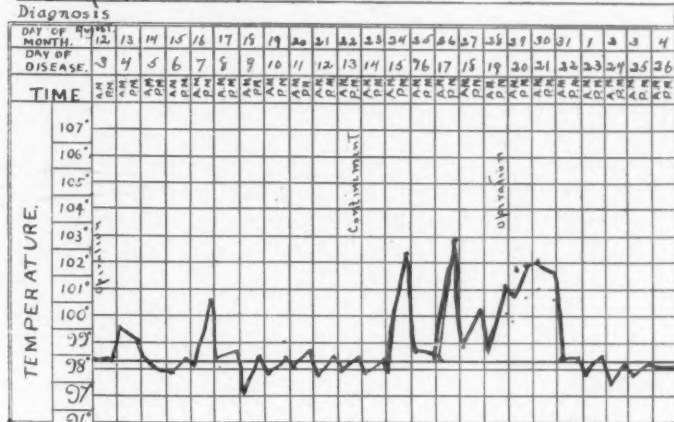
The question of a septic thrombosis of the lateral sinus and jugular bulb now arose. I advised an exploratory operation, to which the patient consented.

OPERATION.—August 28—Granulations half filling the original cavity removed with curette. Lateral sinus freely exposed and found to be covered with dark, soft granulations and to be firm to the touch. Bone was removed from the sinus from above downwards toward the bulb.

A small fistula discharging foul pus, and into which a probe could be passed for two-thirds cm., was found just above and leading into the bulb. Wound packed temporarily.

Mrs. Mariina Colmuri

Diagnosis



The internal jugular vein was exposed in superior carotid triangle at level of the cricoid. As it was apparently free from thrombus at this point the vein was ligated. The ligature was above the facial branch. The incision in the neck closed with interrupted sutures.

The lateral sinus and the upper portion of the bulb were then freely exposed by removal of the bone with the rongeur. A long incision was made in the sinus, but there was no bleeding, as the vessel was filled with firm blood clot. The bulb itself was filled with foul greenish pus. Bulb curetted as far as possible. No bleeding from below. No bleeding from upper portion of sinus on

compression of the opposite jugulars. The clot was removed with the curette and it was necessary to go nearly to the torcula herophili before there was free hemorrhage.

The wound was then packed with iodoform tape, a wick being passed into the bulbus from above.

Good recovery from ether.

August 30—Complains of frontal headache. Temperature remains high—101-102°. Lochia normal. Breasts soft and not sore. Magnesium citrate, q. s. daily. The packing was removed from the lower portion of wound and about a drachm of pus found in the bulb; this was removed and wound repacked.

August 31—Temperature has dropped to normal. No headache. Patient much brighter.

September 2—Temperature remains normal. The breasts cause no trouble. No headache. Incision in neck healed by first intention and sutures removed. Packing removed from mastoid wound. No bleeding from sinus and the cavity is granulating well. Light packing. White count, 14,200.

September 6—Patient is gaining rapidly. Mastoid cavity rapidly filling with healthy granulations. Small sinus persists leading into the jugular bulb, which latter is nearly obliterated by firm granulations.

September 9—Temperature remains normal. Breasts soft. Lochia normal. Mastoid wound clean and granulating well. The swelling over the side of the head is slowly diminishing. Discharged, improved, September 11.

The wound was dressed at intervals for four weeks, at the end of which time it had completely healed. The swelling persisted for several months, but when the patient was last seen in March it had disappeared. The hearing is normal.

The following features of this case are worthy of mention.

1. The long interval between the active suppurative process in the mastoid in May and the appearance of symptoms of a serious nature in August, a period of three months, during which time there was an apparent quiescence of serious symptoms.
2. The fact that the middle ear and drum were apparently normal when seen in August.
3. The absence of chills which are looked upon as diagnostic in septic thrombosis of the sinus.

4. I am now convinced that the lateral sinus was filled with an uninfected thrombus at the time of the first operation. This thrombosis causing a backing up of blood in its superficial branches, which was not readily taken up by collateral circulation and gave rise to the marked swelling of the side of the head. There being no constitutional symptoms such as temperature or chills, I did not feel warranted in opening the sinus at this time.

Two weeks later when the thrombus had broken down and the jugular bulb was filled with pus, the condition was masked by a complicating mastitis, following the birth of the child. The temperature was in no way inconsistent with a simple matitis without other complications, thus making the diagnosis of a septic thrombosis of the lateral sinus very obscure.

416 Marlborough Street.

Involvement of the Internal Ear after Concussion of the Brain.

RHESE. *Deutsche med. Wchnschr.*, Leipzig, April 19, 1906.

Rhese finds the following aural symptoms characteristic of concussion of the brain: 1. Nystagmus towards the healthy side. 2. Diminished bone conduction. 3. Diminished aerial conduction, especially for notes of medium pitch. 4. Peculiar shape of the "curve of hearing." 5. Similarity of the affection in both ears. 6. Diminished hearing for the watch, but not for speech. 7. The fact that the auditory nerve becomes rapidly exhausted when tested with the tuning-fork. 8. Positive Rinné. 9. Congestion of the upper wall of the canal.

YANKAUER.

EVERY-DAY CAUSES OF VOICE DETERIORATION.

BY PERCY FRIDENBERG, M. D., NEW YORK.

At a recent session of the Section on Laryngology and Rhinology of the New York Academy of Medicine, the evening was devoted to a symposium on the Causes of Voice Failure in Public Singers. But a single speaker widened the scope of his remarks to include voice failure in general. More than one of the listeners to the discussion which followed must have been impressed by the fact that practically nothing was said about the common and usual causes of vocal defects, or about the generality of vocal defectives, while much erudition was displayed in the analysis of singers' voice, tone production, vocal methods, graphic registration of sound, and other highly scientific aspects of the case with which the average practitioner rarely has to deal. The public singer forms a very small percentage of the population, and a part which is naturally protected by every possible means against voice defects and strain. The singers at a very early stage of their training learn the importance of natural and sufficient breathing, and have been taught by practical experience as well as by instructors how to take care of the musical instrument of which they are the fortunate possessors. It is known that singers are, figuratively speaking, wrapped in cotton wool and allowed to do nothing which could spoil the quality of the voice. They are most careful as to what they eat and drink, as to exposure to changes of temperature, even slight physical exertion, smoking, and above all, as to how and when they use the voice. Add to this that singers are able to command the services of capable specialists, that they are qualified to recognize the earliest symptoms of vocal disturbance and interested financially as well as physically in prompt treatment, and we shall begin to realize that voice defects are not a common and prevalent evil among professionals.

There is a class, however, in whom these defects are common. The question of voice defects in the public at large, is a feature of this question which, to my mind, is of great practical importance. Comparatively few laryngologists number public singers among their clientele, or at least this class is a very small percentage of those seen daily. On the other hand, we see and hear large numbers of people whose voices are injured by common causes, most of them

preventable, and we pay very little attention to these cases because we do not see them in our offices as patients, but come across them in the every-day walks of life. The commoner causes of voice defect and voice deterioration in the average healthy individual may be arranged in three classes, and depend on climatic conditions, including wind and dust; improper use of the voice, with the factor of strain in loud talking as it is made necessary by our noisy environment, and, finally the lack of attention to voice culture and voice care in our schools. Climate is of great importance for the voice. It is impossible to consider this phase of the subject at length. The point of special interest here is that sudden changes of temperature or of humidity induce catarrhal conditions which not only directly affect the voice producing organs, but may injure the voice even if these portions of the upper respiratory tract are not directly involved. Thus, in nasal or pharyngeal diseases, any attempt to clear the throat by hawking, irritates and strains the vocal cords. As this injurious strain is repeated again and again by those suffering with nasal obstruction or accumulated secretions, a state of chronic irritation of the vocal apparatus is easily produced. Frequent coughing and sneezing have a similar effect. Dust and dirt and the irritant gases of city streets are particularly deleterious in causing the expulsive reflexes just mentioned and in giving rise to acute infections. This is only one feature of city life which adversely affects the voice. Another and a very important one is the constant noise. In our larger cities it is impossible to keep up a conversation out-doors without unduly raising the voice, and on most car-lines it is necessary to shout in order to be heard. In this city the roar of the elevated railway is added, making high pitch and over-exertion inevitable. The amount of effort expended is apparent when we note the facial contortion, the intensity of oral motion, and the loud tone heard during a sudden lull in the street noises. Women are the worst offenders, as they will continue to carry on a conversation at the top of their voices, while most men will, literally, shut up until there is a possibility of being heard without tearing their throats out. American women have been said to converse "like shrieking canaries," and this is one of the causes. Another is to be found in the lack of attention to voice and speech in the home and in the school. In our mixed population, each element contributes some peculiarity or irregularity not only of accent and pronunciation, but of modulation, intonation, and timbre, as well. Each has some typical defect, and some have a large number. Instead

of this being corrected at school, the teachers themselves, sprung from the ranks of the immigrant, are like the blind leading the blind. Anyone who has listened to the exercises of one of our New York public schools will remember the common, slovenly and unmusical speech of the average public school teacher. Distinction and precision of speech are often considered affected, even snobbish. It is a fact that nowhere is grace of speech and voice more truly a class distinction than in this country. The Spaniard, be he grandee or peasant, speaks with beautifully clear and agreeable tones. The French are known for the elegance, distinctness, and distinction of utterance. Even German, rough as it may sound to unaccustomed ears, is spoken distinctly and plainly. Among the English, refinement of utterance is the hall mark of good breeding. The great United States language, and especially the variants heard in our large cities, is a marked exception to the rule of clear and agreeable speech. It is true that "elocution" is taught in our schools, and that there are daily recitation exercises, but little if any heed is given to inculcating the production of beautiful tone, and the precept is nullified by bad example and evil communications which corrupt good speech no less than good manners. The schoolboy imitates the tough and vulgar accents of the street gamin, the college "man" takes as a pattern the variety actor, the professional athlete and the "sport" in diction, as well as in intonation. The home is a correcting influence only in those communities in which there is homogeneity of race, or in the mansions of the wealthy where English governesses and maids are employed and the children have a chance to forget the "American" language.

60 E. 58th St.

A CASE OF BILATERAL ABDUCTOR PARALYSIS OF THE LARYNX.*

BY CHARLES H. KNIGHT, M. D., NEW YORK.

The differential diagnosis of adductor paralysis, abductor spasm and ankylosis of the crico-arytenoid articulation is often very difficult. A conclusion can be reached only after prolonged observation under various conditions. Especial care is needed to decide which element predominates when several co-exist. No doubt may arise in acute crico-arytenoid arthritis, but in chronic cases there are often but few distinctive signs. More or less odynphagia, painful cough, tumefaction over the joint and pain on pressure along the posterior border of the thyroid cartilage are mentioned by Escat among the symptoms. In addition, the laryngeal mirror shows that the arytenoids are jammed together on phonation, instead of the sound one crossing in front of its disabled fellow, as seen in paralysis. (Grabower.) In ankylosis the vocal bands are tense, in paralysis they are flaccid and a sort of "flapping" movement in respiration is discernable. Moreover, other general symptoms indicative of some constitutional disease are present. Spasm of the larynx may be quite persistent, as for example in hysteria, but it is usually clonic, or the position of the vocal bands varies from time to time.

Until within recent years, abductor paralysis has been regarded as one of the rarest laryngeal neuroses, no less an authority than Stoerk having made a declaration to that effect. Yet seven years ago a list of 118 cases was collected by Wilson (*THE LARYNGOSCOPE*, September, 1900), and no doubt others might be added at present. Allowance being made for probable errors in diagnosis there still remain enough genuine cases to take the affection out of the catalogue of curiosities. The origin of the disease may be central or peripheral, generally the former when both sides are involved. The causes assigned are various; tabes, syphilis, pressure from swollen glands, aneurism, or a new growth, diphtheria, hysteria, lead poisoning or other toxemia, fright, voice strain, peripheral neuritis, are all mentioned by different writers. In a large majority of cases there is a positive history of syphilis. It sometime occurs at the very onset of tabes, as a so-called *laryngeal crisis*, and again it

* Read before the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D. C., May 7, 8 and 9, 1907.

develops only after the diagnosis of ataxia has been firmly established by other phenomena.

In three cases reported by Lockard (*Ann. of Otol. Rhinol. and Laryngol.*, March, 1903,) the laryngeal paralysis was detected 7 to 22 months before any other symptoms of tabes. In 22 cases of tabes examined by Sendziak, paralysis or paresis of the abductor, unilateral or bilateral, was found in seven. From his own observations, which include 45 other cases, and from those of Burger (71 cases), he concludes that posticus paralysis is almost pathognomonic of tabes and often precedes other symptoms by a considerable interval. It appears that in these cases a suspicion of syphilis is justified and that always the laryngeal condition should be regarded as a possible forerunner of tabes. On the contrary, from an examination of 20 cases of locomotor ataxia in certain Philadelphia institutions, W. B. C. Harland reaches the conclusion that involvement of the larynx in the early stages of this disease is very uncommon.

In the absence of paralysis nothing more than hyperemia may be discovered with the laryngoscope, but the parts are abnormally sensitive and an attempt to make an application to the larynx, or even the mere examination may provoke a spasm. On the contrary anesthesia may exist. The discovery by Semon and almost simultaneously by Rosenbach that the fibers of the posticus muscle are exceptionally vulnerable, and the equally important discovery by Risien-Russell and Onodi that filaments to the abductor and the adductor muscles run in separate bundles in the recurrent nerve have explained many phenomena of laryngeal paralysis previously obscure. The nerve filaments to the abductor are afferent and excite reflex tonic spasm in that muscle, those to the adductors are efferent and are simple motor nerves. Thus the physiologic law that the irritability of afferent nerves is exhausted earlier than that of efferent nerves comes into play in determining an isolated posticus paralysis (Friedrich). The abductor, a respiratory muscle and solitary, is opposed by several adductors, phonatory muscles, the latter being not only more numerous but more powerful. Their superior strength and resistance is further explained by Grabower by the observation that the nerve endings in the adductors are more numerous, broader and firmer than in the abductor. These differences are a natural provision to meet the comparatively greater functional demands made upon the adductors. In paralysis of the larynx they are the last to yield and the first to regain power in case of recovery. It is hard to reconcile the divergent views regarding the musculature

and the innervation of the larynx held by different observers. They may be due to individual anomalies, to faulty observation, or to the fact that experiments on the lower animals are misleading as regards the human species.

P. Schultz finds no sympathetic fibers in the recurrent, while Broeckaert believes that the laryngeal muscles are supplied by the sympathetic. The latter also opposes Semon's law and asserts that the external thyro-arytenoid muscle possesses less vitality than the posticus and is the first to show signs of degeneration. The views of Krause (1884) and of Grossman are well known, and the Hooper-Donaldson controversy before this association is still fresh in our memory. In a recent paper the palato-pharyngeus muscle is referred to as a "cord-stretcher" by tilting the thyroid cartilage. As a matter of fact, the comparatively insignificant fasciculus of this muscle attached to the thyroid assists in fixing that cartilage, while the crico-thyroid muscle, with its origin at the lower border of the thyroid cartilage, *tilts the cricoid* and thus makes tense the vocal bands. A central lesion or one of the vagus above the origin of the superior laryngeal nerve must impair sensation as well as motion on the side involved, and, of course, affects the action of the crico-thyroid (or thyro-cricoid) muscle.

The following case, which was seen by several specialists here and abroad, and recently under the care of Dr. Duel and myself, offered peculiar problems and gave rise to more or less difference of opinion. The attacks of dyspnea were so alarming, and the space between the bands so contracted that one observer urged immediate tracheotomy, which, no doubt, would have been done but for the resistance of the patient, who preferred death from asphyxia to wearing a tube. Up to the present time the result seems to have justified his decision.

The patient is a man of middle age, of good constitution and of rather nervous temperament. In childhood he was inclined to be choreic and has always been neurotic. He is moderate in his habits, but has been subjected to excessive nervous strain from various causes. He admits excess in alcohol for a year, about four years ago. He had excellent health until six years ago, when he had an attack of ptomaine poisoning. For a year following he suffered increasingly from tachycardia, dyspnea and vertigo, which had been present more or less for a long time previously. Soon after he developed sciatica, which was pronounced by one physician who examined him to be a precursor of tabes. A recent careful examina-

tion by an eminent neurologist discovered nothing to sustain the suspicion. It cannot be learned what, if any, other grounds for the opinion then existed. About six years ago he contracted a chancre, which was followed by mild secondary symptoms, a few spots on the body and very slight and transient ulcerations in the throat. Specific treatment seems to have been carried out with care and thoroughness.

Nearly a year ago he was for the first time awakened one night from sleep struggling for breath. The dyspnea gradually subsided in a few minutes, but left him in a state of extreme mental agitation and greatly alarmed his friends. In the middle of last summer, after running for a train, he had the first day attack of laryngeal spasm. During the last six months there have been twelve or fourteen repetitions, varying in severity and duration, and all but one or two coming on in sleep. Usually they occur in the early morning and are often attended by a dream of choking. Sometimes the attack is observed to follow exertion, excitement, or exposure to local irritation, but often no such relation can be fixed. Under ordinary conditions nothing unusual is noticeable, but after exercise there is marked inspiratory stridor. Breathing in sleep is said to be excessively noisy. The voice is strong, although, perhaps, a little rougher than natural.

The picture in the laryngoscopic mirror is typical of bilateral paralysis of the abductors. The rima glottidis is converted into an antero-posterior slit. The vocal bands recede slightly on expiration, while on phonation they seem to be in perfectly normal position. There is a moderate grade of catarrhal laryngitis. In fact, the mucous membrane of the upper air tract generally is very relaxed and the uvula is extremely elongated. There is pronounced hyperesthesia of the pharynx and larynx. General condition is fair, but the patient is naturally perturbed by his strangling experiences, and by what he has been told. The urine is slightly albuminous and contains a few hyaline casts.

In view of the specific history and the patient's aversion to tracheotomy, it was determined to keep him under close watch and try the effect of medication. Inhalations of mentholized oil, 1/40 gr. of strychnia three times a day, and increasing doses of potassium iodide comprised the treatment, and at the same time the patient was directed to rest much and talk little. The redundant uvula was excised after local irritation had been subdued. At first the iodide was rather disturbing, but by gradually increasing the dose it was possible in three weeks to reach a maximum of 180 grains in three

doses in twenty-four hours. A single application of percutaneous faradism seemed to aggravate the condition and was not repeated. Under this regime there was manifest increase in space between the vocal bands and increased motility. This improvement has been maintained and the laryngeal attacks have decreased in frequency and severity. Further gain has been perceptible since suspension of all treatment some weeks ago. The movements of the vocal bands are still far from normal, but there seems to be ample breathing space and no reason to apprehend trouble. The patient himself volunteers the opinion that the whole disturbance is functional and independent of specific infection. It is certainly clear that the paroxysms are induced by mental perturbation rather than by physical exercise. For example, the most recent and a rather violent one followed a day of extraordinary mental strain in a law court.

In studying this case the various modes of meeting the situation came up for discussion.

Four methods of dealing surgically with bilateral abductor paralysis have been proposed: (1) intubation, (2) ablation of the soft parts lining the voice box, (3) division or resection of the inferior laryngeal nerve, (4) tracheotomy. My experience is limited to the first and last. In the single case in which I resorted to intubation, one of bilateral paralysis in a young woman following extirpation of a goitre, the presence of the tube became so irksome after a few days that the patient insisted upon its replacement by a tracheal canula.

Removal of the crippled vocal bands through a thyrotomy wound is an expedient that relieves stenosis, but destroys the voice. It is to be thought of, if ever, only in desperate cases in which there is no possibility of improvement, a conclusion to be rarely adopted.

On theoretical grounds the ideal procedure is resection of one recurrent nerve, whereby the corresponding band is placed in the *pathologic cadaveric* position, and the voice is finally regained through compensating action of the adductors of the opposite side. No record of this having been successfully done is accessible. Practically it is found that *shortening* of the adductors results from long contraction without antagonism so that the band still keeps a median position. (A. Cahn, *Deutsche Arch. f. Klin. Med.*, Feb. 22, 1903.) It is possible that in some cases a portion of the innervation of the adductors is derived from the nerve of the opposite side, and in addition there may be more or less ankylosis of the crico-arytenoid joint. For these reasons division of the nerve is a failure.

Tracheotomy then remains the operation of choice, especially if the patient is to be beyond means of relief in case of urgent dyspnea. It is best done under local anesthesia. The rapidity of asphyxia in some of these cases is astounding. To my knowledge in one instance a patient left the office of his physician with apparently sufficient breathing space and fell dead on the sidewalk, presumably from apnea, after having walked only a few blocks. On the other hand, most unexpected improvement has now and again been observed when the conditions seemed very unpromising. A case in point is recorded by Glasgow in the third volume of our Transactions, in which complete recovery of one of the disabled vocal bands took place after the lapse of several years. In the same volume Sajous reports a case due to lead poisoning in which recovery took place in the course of nine weeks under potassium iodide and nux vomica. More recently a case has been reported by G. L. Richards (*Journ. of Laryngol., Rhinol. and Otol.*, Oct. and Nov., 1906), in a child two and a half years old. The stenosis came on after a succession of frights, became worse, and in about two months a tracheotomy was required. The tube was worn for three months, and then gradually withdrawn without return of symptoms.

The prognosis in abductor paralysis is less hopeless than is generally believed. Spontaneous recovery, improvement under medication, or a temporary tracheal canula, depending on the cause of the lesion, are among the possibilities. In a large proportion of cases a permanent tube is the only alternative, but if the patient can be kept within reach it is well to postpone this measure until all other resources have been exhausted. On general principles in a case of long standing there is less likelihood of restoration of function owing to degenerative changes in the posterior crico-arytenoid muscle, as well as fixation of the crico-arytenoid joint from protracted disuse.

147 W. 57th St.

**REPORT OF A CASE OF EPITHELIOMA OF THE LARYNX;
REMOVAL BY THYROTOMY, AND NO RECURRENCE
AFTER THREE AND ONE-HALF YEARS.***

BY HENRY L. SWAIN, M. D., NEW HAVEN, CONN.

Believing, as I do, that every case of radical operation for cancer of the larynx with its results, should be reported and recorded in some accessible volume, I hereby present the simple clinical history of an interesting case. Inasmuch as it is a favorable report, I have waited until a sufficient time has elapsed to insure no return before bringing it to your attention. The tendency in recent years is to lengthen the period of complete immunity before placing a given case in the "completely cured" list. Instances have been reported where recurrences have taken place after two years of apparent freedom, and very frequently after one year. In waiting three and one-half years, I feel that should anything ever show in the larynx of the person whose history I am about to report, it must be considered as a new involvement; certainly in no sense connected with the old one.

Mr. Blank, a clergyman of the age of 47, consulted me on the 23rd of March, 1903, complaining of hoarseness which had been annoying him during the whole winter; but during the last few weeks, so great had it become, that he had been compelled to relinquish all public speaking.

His history was a negative one, except that he had used his voice in his professional work freely and without stint. During twenty-five years of active pastoral work nothing has troubled him about his throat. His general health had been good. The family history was negative as regards any predisposition to tumor growths.

Examination showed a very healthy appearing neck and throat. Some slight naso-pharyngitis was present; otherwise nothing abnormal about the nose and throat until the larynx was reached. Here one found on first examination the right vocal cord and arytenoid normal in contour and slightly congested as was the whole interior of the larynx. The whole left half of the larynx seemed much swollen and no clear view of the vocal cord could be obtained, it being obscured by the left false cord.

I made no definite opinion at this interview, and prescribed simply inhalations of *oleum pini silvestris*.

* Read before the Twenty-ninth Annual Congress of the American Laryngological Association, Washington, D. C., May 7, 8 and 9, 1907.

In a couple of weeks the swelling of the false vocal cord had diminished, and one could plainly make out as the congestion disappeared a white papillomatous mass which grew from the upper aspect of the cord and apparently came out of Morgan's ventricle. But little of the cord was visible, as the growth covered nearly the whole length. During the next few weeks, while the larynx seemed to be improving in a general way, the patient was educated so that he became very tolerant of manipulation.

It being my firm conviction that too much instrumentation is extremely bad for any growth in the larynx at the age of a patient of his years, I deferred doing any cutting operation until I was sure I could do it well. During all this period of three or four weeks the patient was directed to speak only in very subdued tones, and was to do no public speaking whatever.

Finally, late in April, a prolonged session resulted in complete removal of all visible portions of the growth, which was friable and came away only in small pieces. Some of these were subjected to microscopical examination, which was indefinite in its results; a soft papillomatous mass which presented no epithelial nests and only a suspected activity in the cells as shown by very doubtful mitosis. Following the operation the patient had no great pain. The vocal cord was freely movable, and there was no evidence of glandular activity in the neck.

The growth promptly recurred, and at the end of June was again thoroughly cleared out. The microscope showed the same doubtful condition as before. At this time the ventricle was cleaned out as well as possible and the whole surface cauterized with pure nitrate of silver fused on a probe. Considerable reaction followed, but quickly subsided, and as soon as the growth showed any sign of recurring, as it subsequently did, it was promptly cauterized with the pure stick. This was done perhaps five times in the following two months, but failed in the end to restrain the growth, although apparently very effective at first.

In September it became apparent that something more radical should be done if the patient was ever to use his voice again. Accordingly, in the last week of that month he was sent, with both microscopical preparations, to Dr. Jonathan Wright for examination and advice. Dr. Wright reported that when he looked at the specimens he was inclined to believe it benign. When he looked at the larynx, however, he was placed very much in doubt. In such a case where the growth was so broad of base he felt that he ought to advise removal through external incision.

This being my own view, and the patient acquiescing, on the 10th of October Professor William H. Carmalt did a thyrotomy, beginning with the usual ether narcosis. A simple incision down to the isthmus of the thyroid; tracheotomy just above it; anesthesia with chloroform for the rest of the operation. The larynx was split open in the usual manner. Once this was done there was not the slightest room for doubt as to the expediency of the operation. Quite a large mass of tissue was removed with forceps and scissors. To do this thoroughly it was necessary not to spare either the false or true cords. Perichondrium seemed perfectly healthy. After stanching the bleeding with hot sponges, every suspicious area was thoroughly cauterized with the Paquelin cautery. By this means also all the bleeding except the merest oozing was stopped. The perichondrium and thyroid cartilage were sewed together, the tracheotomy tube removed, and the whole wound stitched up, leaving a small drain at the bottom.

The patient was put to bed with the feet slightly raised, and passed a fairly comfortable night. Except for a most profuse bronchorrhagia which at first relieved the excessive dryness of the early night, and which continued with great violence for the first three days, and then suddenly ceased, there was an uneventful recovery. The temperature never went above 100.2°, which was on the third day. One stitch toward the bottom of the incision below the level of the cricoid ring became infected. This later discharged considerable matter, and finally a sinus developed which ran between the skin and the anterior wall of the larynx, and a probe after passing up three-fourths of an inch entered the larynx exactly at the anterior commissure of the vocal cord. This proved very annoying and tedious, at one time quite concerning us as to whether in the granulation tissue which developed cancer cells might not be in evidence. Early in December it finally healed up in response to very urgent measures, and since then the patient has had no trouble whatever either with his larynx or with the wound.

During the first three days he was nourished by the rectum, and larynx completely healed over. At the end of the first week a slough or scab came off, and from that time on the interior of the larynx was free from all symptoms.

He had no trouble in breathing except the first night, when the sticky mucus which preceded the bronchorrhea greatly annoyed him, although at no time was there the slightest distress for lack of breath, the annoyance consisting more in the pain which was caused by the coughing of the sticky mucus from the wounded surface.

During the first three days he was nourished by the rectum, and after the first twelve hours was allowed to suck ice and swallow sterile water in small amounts. The pain on swallowing was severe on the second and third days owing to the motion of the larynx in the wound, but this diminished gradually thereafter.

Examination of the growth showed undoubted epithelial nests and in the lower layers marked cell activity with multinucleation of the cells, leaving no doubt as to the diagnosis. No attempt was made at the time of the operation to remove any of the lymph glands, as there was not the slightest evidence of any involvement.

Since February, 1904, the patient has spoken in a perfectly audible but slightly husky voice; at the present time the huskiness is hardly noticeable. At my suggestion, he has entered into editorial and other duties which require little or no use of his voice. Now he can speak loud enough to fill a large audience room, but he does not attempt it.

A fairly good presentment of the vocal cord has been produced in the shape of a dense white band where the true cord should be and of which it is probably a part. The false cord is flatter than normal, and Morgan's ventricle practically eliminated. I have seen him within a month, he having made the journey to me in order to make this report complete, and his larynx is in absolutely perfect condition.

By way of comment upon the case, it may not be amiss to emphasize these facts:

The ever present difficulty in coming to a diagnosis.

The wisdom, even when in doubt, of operating in a way to insure complete removal.

The oft repeated observation of the surprising differences in the appearance of the growth when the larynx is open.

The impossibility of being sure you have removed everything malignant; hence the wisdom of the use of the Paquelin cautery.

The possibility, when the larynx is roomy, of shutting up the whole wound instead of leaving the tracheotomy tube in place.

The unquestionable advantage of an absolutely recumbent position with the feet raised, during the first days following the operation.

And finally, that when you have an intelligent, brave and tractable patient, how small the suffering seems as compared to the mercy of a complete cure.

232 York St.

PHYSIOGNOMY AND ITS RELATION TO THE SIZE AND EXTENT OF THE SINUS FRONTALIS.

BY H. J. H. HOEVE, M. D., DES MOINES, IOWA.

Our attention is called by Macalister to the fact that the development of the frontal sinuses is intimately connected with the development of the teeth, the extension of the superior maxilla and the protrusion of the facebones, in fact the outer table of the frontal bone separates from the inner at the location of the future sinus, about the period of second dentition.

At about the twentieth year, the sinuses are supposed to have reached their full development. (Treves, Combe.) According to the same men, large sinuses are mostly found after the twentieth year, and it certainly can not be doubted but that there is an enormous increase in the size of the frontal sinuses about this time, which is in a great many cases easily noted by the decided change which takes place in the lower frontal region of the head, a change which gives the face a stronger and more mature expression and which is partly brought about by the internal extremities of the superciliary ridges becoming more prominent.

I have shown that the development of the frontal sinus is in close relation to the general proportional makeup of man and that they differ very much in size and extent, according to the temperament which the man possesses. It is, of course, impossible to describe a distinct type of frontal sinus for every shade of the mixed temperaments which present themselves everywhere to the observing eye, but for our purposes it is better to follow the anatomical classification of temperaments as given by Dr. Jacques, the Motor, Vital and Mental. In the mixed temperaments, mostly one or the other predominates and for our purposes, we may classify them also according to the characteristic which predominates into the Motor, Vital and Mental.

The Motor Temperament.—This is the easiest one to recognize, for it can be seen at once that the bony framework and the musculature is developed at the expense of the rest of the body. It is correspondingly found more frequently in man. Men of this type are generally tall, have broad shoulders and a more striking than elegant figure. Adipose tissue is decidedly lacking and correspond-

ingly we find that the joints are quite prominent. The neck is rather long, but the muscles stand out powerfully when contracted. The face is frequently oblong or angular in form, the front teeth are mostly large and have a yellowish hue. The lower jaw is always massive and frequently square, what Woolsey would call a prizefighter's jaw. (The shape of the jaw differs according to the admixture of other temperaments.) The malar bones are more prominent and higher than in other types. The thorax is well developed, the hands are long and have a powerful grasp. The physiognomy gives the impression of being earnest, determined or stern.

The Forehead of the Motor Temperament.—The forehead is generally slightly retreating and is never very high, this is mainly due to the parietal bones bulging out in these types much farther than in others. In short, the motor region of the brain is developed at the expense of the upper part of the frontal and the occipital lobes. The superciliary ridges are very prominent, but not the entire ridges, the internal parts of those which bound the glabella laterally being the most prominent. These ridges are not as smooth in outline as in the other types, but in fact the only part which is well developed is the internal part, which has the appearance in these cases of a rough, bony protuberance.

The interfrontal region seems to form two arches, which extend from the prominent portion of bone between the superciliary ridges, a long one, upward to the moderately developed coronal region with its concavity forward and, a short one, downward to the naso-frontal suture, also with its concavity forward. The region above and between the superciliary ridges, glabella is mostly well defined, on account of the internal extremities of the superciliary ridges being so prominent, but this region is never as large as in a mental or vital type.

The Transverse Naso-Frontal Line of the Motor Temperament.—It corresponds to the topography of the naso-frontal suture. A well marked transverse naso-frontal line, that is one, which forms a distinct retreating angle between the upper part of the nasal bones and the prominent internal extremities of the superciliary ridges, being buried between and just below the prominent internal parts, indicates the absence or smallness of the lateral or the presence of the internal set of frontal sinuses.

The Vital Temperament.—The Vital type is characterized by a body taller but much wider and limbs much shorter than the motor type. This type is found much more frequently among women

than among men. The face is round and has a frank and pleasing expression, the nostrils are wide, the neck is short and thick and the shoulders are broad but nicely rounded. The chest is full and the abdomen is well developed. The arms and legs are plump, but tapering, and the hands and feet are very small. The head is round.

The Forehead of the Vital Temperament.—This is not slanting as in a motor type, but bulging forward. In a great many cases there is a well developed intersuperciliary region, but here it is not due to the prominent internal portions of the superciliary ridges, but in a great many cases we find here an enormous breadth between the eyes, and the entire inferior region of the forehead between the external angular processes of the frontal bones may be nicely rounded so as to present a convexity forward, without the slightest elevation indicating the location of the superciliary ridges. Sometimes the internal part of the ridges is prominent, but here we do not find the sharp rough protuberance at the internal extremities of the ridges as in the motor type, but rather an extensive bulging of this region, and whenever the lower part of the forehead presents this peculiarity in a vital type, you can be sure to find very large and extensive sinuses. In these cases the lower frontal region is convex from one external angular process of the frontal bone to the other. The forehead is gracefully rounded and presents a curve with its convexity forward, extending from the coronal region where the hair begins to the nasion, in fact it can be said, that this curve forms a part of a circle, which has its center just between the apices of the orbits. The forehead is frequently rapidly slanting backward and upward from a point about one-half inch below the line where the hair begins.

The Transverse Naso-Frontal Line of the Vital Temperament.—In this type, it seems to form a sharp transverse cut at the root of the nose, on account of the lower region of the forehead, from one external angular process of the frontal bone to the other forming a smooth arch, which is pushed forward in such a way, as to overhang the root of the nose. The line is not altered materially in those cases of vital types, which have nicely marked superciliary ridges, and which consequently have the largest sinuses.

The Mental Temperament.—This type is also very frequent in women. The most distinguishing feature is the frail body, as compared with the size of the head. The head is large, the face oval

and the features delicately cut, but most sharply outlined. The teeth are bluish and the muscles well developed, but not large. The hands are slender and tapering and the fingers long, in fact, the entire appearance shows that all the structures of the body are delicately molded, according to a very sensitive nervous system.

The Forehead of the Mental Temperament.—It is mostly high and has a pale color. The lower part is not very prominent on account of the coronal region being better developed. If the superciliary ridges are plainly visible as generally in these cases, then they present a nice and even contour. They are about as well marked at their outer as at their inner extremities and are not rough like the ones of the motor type.

The Transverse Naso-Frontal Line of the Mental Temperament.—In this type, the naso-frontal line is not very prominent, on account of the forehead and the dorsal surface of the nose forming a much greater angle than in the motor type, in fact the sharp angle between the upper border of the nasal bones and the internal extremities of the superciliary ridges seems to be filled in with bone and the entire transverse naso-frontal line seems to be carried downward and forward. (Of course the degree of slanting of the forehead must be taken into account.)

QUALITY OF THE FRONTAL BONES IN THE DIFFERENT TEMPERAMENTS.

Motor type.—Course and heavy bones. Thick skulls. Frequently a large amount of diploe present between the frontal sinus and the external plate of the frontal bone. The bone is not as dense as in the mental type.

Vital type.—Thin, frail bones. Skulls thin and brittle. The anterior wall of the frontal sinus frequently fused with the external plate of the os frontalis.

Mental type.—Delicate, strong and very dense bones. Skulls of medium thickness. Diploe frequently present between the sac of the sinus and the external plate of the os frontalis.

Size of the Sinus Frontalis in the Motor Temperament.—In this temperament the sinus is very small or absent. This is the type, we must look out for Trephining in the region of the frontal sinuses in such a case, would mean, in at least 60% of them, the same as opening the cranial cavity.

Size of the Sinus Frontalis in the Vital Temperament.—In this type, you always find a large sinus, which extends well outward. If the superciliary ridges are prominent even in their smallest details, in this type, you can expect to find sinuses which are very large, which extend well outward and upward and the lowest point of which is mostly the upper opening of the infundibulum.

Size of the Sinus Frontalis in the Mental Temperament.—In these cases the sinuses are frequently of the average size, which is given by Sir Logan Turner in his article on the frontal sinuses, in the *Edinburg Medical Journal* of May, 1898. (Height, 31 mm. from the upper opening of the infundibulum vertically upward; breadth, 30 mm. from the median septum horizontally outward; depth, 17 mm. from the anterior wall at a level of the fronto-nasal suture backward along the orbital roof.) Of course, what he states about the sinuses never being symmetrical is true, but in the mental type we find sinuses which come closest to what could be called symmetrical.

Instrumental Diagnostic Methods.—Even though it does not belong to this paper, to mention or discuss instrumental diagnostic methods, I must mention Sir Logan Turner's important method of transillumination in case of the frontal sinuses, the technic of which is familiar to you all. I believe that every case of empyema of the frontal sinus or sinuses, should be carefully examined by this method before an operation is decided upon, and then if it should seem necessary to open the sinus or sinuses, this same method should be used as one of the important aids in the deductive diagnosis, as to the size and extension of the involved sinus or sinuses. By following this method exactly, the electric bulb with its short tube will be placed about 17 mm. to one side of the middle of the nose at its root. This would be above the internal canthus of the eye, in fact just behind and inferior to the internal angle of the frontal bone. Sir Logan Turner is correct in calling this the thinnest place of the entire sinus, but even if the electric bulb should be applied still farther backward, I do not believe that it is possible in every case, to make a diagnosis of the presence of the large accessory sinus, which is so frequently located behind the sinus proper. I should like to again call attention to the cuts in Dr. Cryers paper on the frontal sinuses of January 26, 1907, in the *American Medical Journal*, which verify some of the facts mentioned in this paper.

After having completed this paper, I became acquainted with Dr. E. Zuckerkandle's *Anatomie der Nasenhöhle*, 2nd edition, Vol. 1, 1893, and I am very glad, indeed, to see that one of my main observations coincides with what he states on page 325: "However, it should be noted that when the sinus frontalis is very large, not only the eyebrows, but also the supraorbital region as a whole is prominent, but when the sinus is lacking the prominence is usually limited almost to the arcus supraciliares."

The first variety he mentions is undoubtedly the second variety of the vital type, mentioned in this paper, in which the entire lower forehead is convex from side to side, and in which the superciliary ridges are prominent and nicely marked. The second variety he mentions is in all probability a motor type, in which the internal extremities of the superciliary ridges are very prominent.

1505 W. 9th St.

Congenital Deafmutism. JOH. HABERMANN. *Arch. f. Ohrenh.*, Leipzig, Dec. 1904.

Female, 44 years old; congenital deaf-mute; cause of death, pernicious anaemia. The pathological findings, which were essentially alike in both ears, were as follows:

Hypertrophy of the mucous membrane of the middle ear. Adhesions between the head of the malleolus and the roof of the tympanum. Exostoses of the inner wall. Thickening of the base of the stapes, and fibrous and bony ankylosis of the stapes. Atrophy of the nerves of the cochlea and ascule, hypoplasia of the organ of Corti, and various anomalies of the structures in the turns of the cochlea.

YANKAUER.

A CASE OF CLOSED SINUSITIS OF THE ETHMOID LABYRINTH, WITH EXOPHTHALMOS.*

BY HARRY KAHN, M.D., AND MORTIMER FRANK, M.D., CHICAGO.

F. G., a school girl of fourteen years, who gives the following history: Father died of tuberculosis; the mother and two brothers in good health.

The patient, during the year of 1904, suffered successively with measles, scarlet fever and diphtheria. In 1905 she had chickenpox, and in 1906 an attack of mumps. Following the attack of chickenpox the patient noted a protrusion of the left eye, which, as time progressed, became more and more prominent. There was no headache, no hydrorrhea, no parosmia, no pharyngeal or laryngeal irritation; in a word, there was no symptom of the subjective variety that could be referred to the nose or to the accessory sinuses.

The *ophthalmological examination* presents nothing of importance except the exophthalmos. The globe was pushed outwards, forwards, and to the outer side of the orbit. On palpation, could be felt the sharp posterior edge of the lachrimal bone, which was driven forwards. Vision, 6/7, and with a $+0.50 = +0.75 \times 90$, 6/6. The *ophthalmoscopic examination* was negative. There was no diplopia, and ocular movements free in all directions. Lids in perfect apposition. Tension normal, and no tenderness or pain on pressure.

Rhinoscopic Examination. The septum is almost straight. The right side of the nose is normal. The left showed a large tumor-like mass, polypoid in character, in the place of the normal anterior end of the middle turbinate body; it filled the whole of the olfactory space, lying flatly against the septum on the one side, and impinging on the external wall on the other.

After the application of adrenalin and cocaine the mass did not shrink, was hard and immovable when tested with the probe, hence a bullous anterior end of the middle turbinate was diagnosed. No pus was visible in the nose at any time, nor did the patient give any history of a purulent discharge; in fact, she stoutly denied ever having had any such discharge.

The anterior end of the middle turbinate was resected with the scissors and the snare. There immediately escaped a large volume of white, odorless pus, which has continued to discharge to a greater or lesser degree ever since the operation, on the 17th of January,

* Read before the Chicago Laryngological and Otological Society, February 19, 1907.

1907. The ethmoid labyrinth was cleaned as well as possible at the time. An opening was made, large enough to insure good drainage. The progress of the case has been very satisfactory. The discharge of pus is gradually becoming less, and the eye is returning to its normal position.

This is a case of true closed, or, as the Germans name them, "locked," ethmoid sinusitis, with a perforation of the lamina papyracea. That this is the diagnosis is shown by the results of the operation, namely, the finding of pus in spite of the absence of symptoms pointing to its existence, and the return of the eye to its normal position in so short a time after the operation, argues for a perforation of the lamina papyracea.



Case of Closed Sinusitis of the Ethmoid Labyrinth with Exophthalmos.

The case is presented, not because we believe this condition is an extremely rare one, but we do think that this is an uncommon case, and, further, the case is now of two years' duration. During that time, it has been seen by several of our colleagues, by whom various diagnoses were offered, such as osteoma of the orbit, tumor of the orbit, etc. One practitioner sent the patient to a hospital for enucleation of the eye, but at the last moment she rebelled and left the hospital.

That the enucleation of an eye is not so uncommon, we need but to refer to the recent paper by Fish (Medical Record, vol. 70, page 689), in which he reports five cases of enucleation of the eye in patients suffering from a closed ethmoid sinusitis. From this case, and those reported by the last-named author, warning should be taken by the ophthalmologist not to enucleate an eye of this type without first looking into the nasal condition.

103 State St.

THE ALVEOLAR ROUTE OF OPERATING UPON THE MAXILLARY SINUS.

BY MELVILLE BLACK, M. D., DENVER.

This article is prompted by the article of Dr. Walter A. Wells, in the December number of this journal. This gentleman is evidently so prejudiced against the alveolar operation that he fails to give it even scant justice.

Dr. Wells considers the operation through the alveolus unjustified for many reasons, but the natural inference is because he considers it an operation which does not cure. He seems to think that it is confined to making an opening into the antrum through a tooth cavity, and putting in a drainage tube or plug to maintain the patency of the opening; that the antrum can not be curetted through the opening, nor satisfactorily treated; that the opening will close before suppuration has ceased, unless kept open by a tube. He also objects to the communication with the mouth, because of the possibilities of food getting into the antrum. In short, he classes this operation as "tentative and conservative," and that it "has no justification whatsoever."

I desire to take issue with every objection he has made to the alveolar operation. I do not desire to criticise the operation advocated by Dr. Wells. It is a well known and meritorious procedure. His method of making an opening through the naso-antral wall is the only part, I presume, for which he claims originality. His cutting-rasp-trocar is an ingenious instrument. I shall certainly get one and give it a trial, as I fully realize that the nasal route is in some cases more satisfactory than the alveolar route; it involves the sacrifice, however, of one-half of the inferior turbinated body. It mutilates, to a certain extent, the nasal interior, and in my opinion is not a justifiable procedure as a primary operation, if the alveolar opening can be made without the sacrifice of a good tooth.

Now for the alveolar operation, as I perform it. I always select one of three tooth sockets, the second bicuspid or the first or second molar. If one of these teeth is out, this space is used. If no one of them is out, I select the one most diseased. The opening into the antrum should be made as large as the space between the teeth will permit, unless several teeth are out. In this event, the opening

should have an all round diameter of three-eighths of an inch. The primary opening should be made with a quarter-inch trephine, and this opening enlarged with a burr. Before enlarging the opening with the burr, it is well to clear the antrum of all its pus by syringing. If only one tooth is out the opening should be enlarged laterally until the opening of three-eighths of an inch in its greatest diameter is made. Its other diameter is governed by the distance between the teeth. The antrum should now be freed of all blood by syringing or irrigation, then cocain and adrenalin springed into it. A Miles' curette is now introduced, with its shank so bent that all the walls of the antrum can be reached and the cavity thoroughly curetted. Syringing or irrigation is again practised until all debris is washed away, when the opening is packed with gauze and the patient is then sent to a dentist, that he may take an impression of the part and make for him a small saddle-shaped plate or bridge, which fits over the alveolar process, and covers the hole, and clasps the teeth in front and behind for its support. If the patient is wearing a plate which covers the part, this is all that is required. This saddle-bridge can be made of rubber, gold, silver or aluminum. It is easily removed and replaced by the patient. Until the dentist has made this bridge, I see the patient daily and syringe out the cavity with some antiseptic wash, and repack the opening with gauze. After he gets the bridge I cauterize the whole interior of the antrum with pure carbolic acid applied with cotton wound upon cotton carriers, suitably bent to reach the antral walls, and then immediately neutralize the acid by syringing alcohol into the antrum. The patient is now taught how to cleanse the cavity. I see him at weekly intervals and apply the carbolic acid. The opening will begin to grow so small by the third week that it must be enlarged. This is very simple. Cocaine is applied in the opening as well as adrenaline, and with a cataract knife the bony opening is reamed out. A collar of tissue comes away quite easily if the precaution is taken to introduce the point of the knife well up into the antrum. In this manner the opening can be maintained large enough for all purposes of treatment until the case is well. I have not had a single case in the last ten years which has exceeded four months' treatment, and very few go beyond six weeks; many of these cases have had chronic empyema of the antrum for years. Many of these antra have contained large amounts of granulation tissue, and some of them dead bone. I had all kinds of trouble as long as I used tubes. I do not believe the alveolar operation will ever be popular as long as tubes are used. I am satisfied that their use has been largely responsible

for the disfavor in which many hold this operation. They interfere with perfect drainage and they promote the formation of granulation tissue in the antrum about the end of the tube, which may keep the disease going indefinitely. In short, they act as foreign bodies, and as a splendid canal through which food and mouth secretions pass to the antrum. I discontinued using them ten years ago and at once my cases began to get well in a much shorter time than ever before.

When I began using carbolic acid another gain was made. So far as the douching agents are concerned, I am indifferent, so long as they cleanse the part. This operation with me is successful. If it were not I should not continue to use it. The disease rarely recurs. When it does, even though the hole is firmly closed with tissue, I ream it out with a cataract knife, have them wear the bridge again, and proceed with the carbolic acid, cleansing and curetting if necessary. In a few weeks they are well. I object to hearing this operation through the alveolus slandered. There are, no doubt, more radical operations, but in my opinion they are not indicated unless the patient's teeth are all sound. I am not sure but that I should prefer to lose one of my teeth rather than one-half of my interior turbinate.

Majestic Building.

Anosmia, Parosmia and Parageusi. C. ZIEM. *Monatschr. f. Ohrenh.*, Berlin, Sept., 1904.

The author describes the disturbances of taste and smell associated with suppuration in the maxillary sinus, and recites histories of cases in which these disturbances were relieved when the sinus affection was treated.

YANKAUER.

SUPPURATION IN THE ETHMOID AND SPHENOID SINUSES WITH PARALYSIS OF THE THIRD NERVE. CASE REPORTS.

BY JOHN A. THOMPSON, M. D., CINCINNATI, OHIO.

CASE 1. Mrs. S——, aged 40, American, housewife, was admitted to the private service of Dr. J. C. Oliver at Christ's Hospital, September 29th, 1906. She is an unusually robust woman. She had been perfectly well until three weeks before admission. At that time she had a very severe and sudden attack of pain over the left eye and left temple extending later to the back of the head. At night the pain disappeared and she was well for one week. While at breakfast a week after the first attack, the pain returned suddenly and she was nauseated and became speechless. This severe pain lasted only a short time and was succeeded by a dull ache. The following day the pain still remained and the left eyelid began to droop. The next day vision was impaired. The first and second attacks of pain occurred on Sunday. The Wednesday following the second attack she consulted her family physician about the continuing headache and the drooping of the left eyelid. While in the doctor's office the pain came on again, first in the eye and temple and then extending over the whole head. It was so severe she lost consciousness. From that time until she came to Christ's Hospital to the service of Dr. J. C. Oliver she was confined to her bed; suffering intensely. When admitted the left eyelid was paralyzed, the pupil dilated and there was only slight movement of the eyeball. The temperature was usually normal and never went above 99.4°. She was given Asperin, grs. v, every four hours, and codein to relieve the intense pain. First an ice cap and later hot water bottles were tried for relief of the pain, with little benefit. She was given four mercurial inunctions before I saw her and took potassium iodide about three weeks. At Dr. Oliver's request, Dr. C. W. Tange-man saw her October 4th. His report is as follows:

"The eyelids: On the left side I found the eyelid drooping, complete ptosis; on the right side normal.

Eyeball: Left eye, normal in appearance, no redness, all the media clear, transparent; right side, normal.

Pupil: Left eye, widely dilated, did not re-act to light; right side, normal, re-acted to light and to all the different tests.

Movements of the eyeball: Left side, there was complete paralysis of the third nerve, the eye deviating externally; right side, normal. No pain whatever in the left orbit on attempt to move the eyeball.

Field of vision, as nearly as could be tested, was below the normal on the left side, a little better on the right side. (Could not be well tested because the patient was in a recumbent position.)

Range of vision: Left side, required a corrected glass of 2. + diopters. Right side, normal.

The fundus: Left side, a distinct choked disc and swollen nerve so that the vessels were partially covered, with a hemorrhage on the nasal side. Right side, some disturbance of this same character, but not to so great an extent.

History absolutely negative. No rheumatism, no specific trouble, no malaria. I saw her at two or three different times, conditions unvarying."

I saw this patient October 13th at Dr. Oliver's request. She was very nervous and unmanageable, having had little sleep for three weeks as the pain was so severe. Examination of the nose showed some necrosis of the right middle turbinated bone. Examination of the left nostril was difficult as a large septal spur hid the upper portion of the cavity. I could recognize extensive disease of the left Ethmoid cells and probable suppuration in the sphenoidal sinus on the same side. Operation was advised and made October 15th under chloroform anesthesia. The spur was first sawed from the septum. The projecting diseased portion of the left middle turbinate was snared off. The ethmoid cells were thoroughly opened with forceps and curette until all the diseased bone was removed. So extensive was the necrosis that a large opening was made into the orbit. The anterior wall of the left sphenoidal sinus was then removed, leaving it freely open. The necrotic portion of the right ethmoid was then snared off and the wound curetted down to sound bone. The whole operation was done through the nostrils with no external wound. The patient was put to bed in good condition. There was a large extravasation of venous blood into the orbit which gave her a black eye for several weeks. The first noticeable effect of the operation was the relief of the severe pain. In forty-eight hours the patient was comfortable and sleeping better than she had done for weeks. One moderately severe attack of pain was caused by a blood clot clogging the opening of the sphenoid

sinus. She improved rapidly and left the hospital twelve days after the operation.

There was a slight reaction to light in the left pupil when she went home, but the other paralytic symptoms remained unchanged.

November 13th, her husband wrote me that her general health was good and she slept better than for ten years. December 28th, he wrote the eye was open, but with an external squint so she was much troubled by double vision. The eyeball could be moved voluntarily, but control was not perfect.

She was advised by letter to paste a piece of paper over the glass in front of the left eye and depend on monocular vision. January 5th, 1907, he reported her able to focus the eye.

The patient returned to the city late in January. The following is Dr. Tangemann's report of the ocular condition:

"Feb. 2nd. I saw this patient again. Vision, left eye, 20/30; right eye, 20/20. Still complains of some pain about one inch above orbital region on the left eye. There is still a slight amount of ptosis on the left side. (The lid seemed heavy, which possibly was the reason it lagged.) The paralysis of the third nerve has nearly disappeared—the pupil reacted to light and the movements were free in every direction but not fully restored, because it required a prism of 10° base up and in, to make her see single. The chief complaint was that she sees double."

The patient said to me she only saw double when she was tired.

One symptom spoken of by Dr. Tangeman while the case was under observation is not mentioned in his report. Accommodation remained while all other muscles supplied by the third nerve were completely paralyzed. It was on this symptom I based the favorable prognosis given in the case.

Examination of the nose showed perfect healing of all the operation wounds. The opening into the left sphenoid permitted free inspection of the sinus and the membrane appeared perfectly healthy.

In a short time recovery will be complete.

Several points in this case are notable. The extensive destruction of bone with no symptoms attributed to the nose is very uncommon. The case was under close observation in the hospital by careful and competent physicians for two weeks before it was thought advisable to call a rhinologist.

The severity of the pain, producing unconsciousness at one time, was more marked than usual, though the suffering of patients with suppuration in the accessory sinuses of the nose is generally extreme.

Finally the recovery from an apparently hopeless paralysis shows the possibilities of intranasal surgery.

CASE 2. Dr. C. E. R., of Lancaster, Ohio, was referred to me February 21, 1907, by Dr. C. W. Tangeman. He gave the following history: In October, 1906, he had an attack of la grippe with intense headache and some fever for about ten days. Near the end of this attack his vision became somewhat cloudy, and the outlines of objects seen were indistinct. When he awoke one morning he looked toward an adjacent house, where there were two windows, and he saw four. Since that time the double vision has been continuous. He has to wear an opaque glass before the right eye so that he can guide himself without running into objects, as he is unable to distinguish the apparent from the real one. There has been no pain nor headaches since this attack. He said he has had slight catarrhal symptoms for several years, but nothing pronounced enough to require any treatment. He had previously worn glasses for astigmatism, but there had been nothing in the previous ocular examinations to direct attention to the nose. When he consulted Dr. Tangeman there was a marked divergent squint, the right eye being turned outward. There had previously been marked dilation of the pupil. Examination of the nose showed evidences of old atrophic rhinitis. On the right side the middle turbinate was much enlarged and was in contact with the septum. An opening into the anterior ethmoid cells was made at the first visit and a large amount of pus was evacuated. I did not attempt a complete operation at this time. One week later the doctor returned to the city and I removed practically all of the anterior ethmoid cells under cocaine anesthesia. He said the drainage of the pus a week before had resulted in marked improvement so the eye could be focused for near objects by a special effort. March 20th, this patient was seen again at my office. He had discarded his opaque glass before the right eye, as he was able to drive or walk without his vision of objects being confused. The only time he saw double was when he attempted to look at objects on his left side. The pupil was still slightly dilated. The nasal wound had healed except at one small point where a little carious bone required curetting. The extensive destruction of bone in this case with so little pain is unusual. The rapid recovery from the ocular paralysis is particularly gratifying.

628 Elm St.

THE RELATION OF TONSILLITIS TO RHEUMATISM.*

BY E. FLETCHER INGALS, M.D., CHICAGO.

One of the first references that I find to the relation of these two diseases was by Desmos, about 40 years ago. He stated that the poison of rheumatism occasionally favored the production of inflammation of the tonsils. The late Sir Morell Mackenzie, in 1880, endorsed this statement and some other authors since that time have accepted this view, but the majority of those writing upon diseases of the throat have not mentioned any connection between the two diseases. I was one of those who several years ago accepted the theory that rheumatism was a frequent cause of tonsillitis and I have seen some well marked cases that tended to confirm that belief; yet, during the past few years, I have unconsciously drifted into the opinion that the relation was only exceptional. In 1901, F. De Haviland Hall and Herbert Tilley wrote: "It is now almost universally agreed that there is an intimate connection between tonsillitis and acute rheumatism." It must be conceded that inflammation of the tonsils and acute rheumatism are sometimes associated and that the same causes occasionally seem to excite the two affections. Some authors go so far as to claim that the rheumatic poison, whatever it may be, practically always enters through the tonsils.

Dr. O. T. Freer, who examined the recent literature for me, has found a number of references to this subject, the most important of which are as follows:

In 1900, Woloshinsky¹ reported a house epidemic of nine cases of lacunar tonsillitis immediately following which three of the patients acquired rheumatism. He regarded polyarthritis as secondary to inflammation of the tonsils, which he thought was produced by pyogenic germs. Frederick A. Packard² writing in 1900, states that during the course of an angina or following it the most important complication is acute articular rheumatism. He thinks rheumatism an infection due possibly to several varieties of bacteria. The rheumatism also, he thinks, may be caused by absorption of toxins. This appears to me the most common cause. He believes infection frequently occurs through the tonsils, more especially in connection with acute rheumatism.

* Read before a Joint Meeting of the Chicago Laryngological and Otological Society and the Chicago Medical Society, March 20, 1907.

In 1901, Julius Ullmann,² expressed the view that the normal tonsil is a protection, but that the diseased tonsil is a source of infection, which may be the place of entrance for acute rheumatism, endocarditis and chorea.

In the same year St. Clair Thomson³ states that: "Probably 30 to 80% per cent of the cases of acute rheumatism are preceded by angina; though the relation of the two affections is not yet clear. The tonsil without visible change may be a source of entrance for infection." An editorial in the *Jour. of the A. M. A.*, Jan 19, of the same year, entitled "The Tonsils as a Portal for Rheumatic Infection," appeared to express the prevailing opinion on this subject at that time. It states: "Tonsils seem not only to be able to act as places of entrance for articular rheumatism but also for myocardial infection."

Dr. W. Cheatham⁴ in the same year in an epitome of the subject of rheumatism as a cause and effect in inflammation of the throat, expresses similar views.

Gurich⁵ asserts his belief, founded upon clinical experience, that in many cases articular rheumatism follows chronic desquamative inflammation of the follicles of the tonsils. In supporting this view, he mentions a number of patients who for years suffered from numerous relapses of articular rheumatism that did not recur after treatment of the tonsils.

In 1905, Rottenbiller⁷, mentions 29 cases from his own practice in which polyarthrititis followed follicular tonsillitis, and the same year Parmentier⁸ reports one case in a child, where rheumatism promptly followed the cessation of tonsillitis.

The subject is summed up as follows by Isaac Adler,⁹ who emphasizes the frequency of rheumatic infection through the tonsils. This infection need not appear as a follicular angina with fever, swelling of the tonsils, etc. On the contrary, a severe inflammatory reaction seems to act as a preventive of general infection. It is proven (by him) that very virulent bacilli may pass through the tonsils without local changes in them of reactive or inflammatory nature. The thin epithelium of the lacunae is most often injured and germs may pass through it and enter the lymphatic vessels. For this reason, a slight irritation of the tonsils may be the prelude to a more or less severe rheumatic or septic general infection. The author states that muscular rheumatism most often settles in the muscles of the neck, nape of neck and shoulder and that he is convinced that it has a

bacterial source. The acute beginning of these symptoms is nearly always preceded by tonsillitis. He thinks also that the tonsillar source of pneumonia is certain in many cases; and he regards desquamative nephritis, without oedema, vomiting or headache, or other subjective or objective symptoms except the findings in the urine, as in some way related to tonsillitis. He advises the extirpation of tonsils that show the least sign of disease. The most dangerous tonsils he deems the non-hypertrophied ones, with soft permeable tissue and open communication with the lymph passages, especially where there are epithelial changes in the crypts.

I can find no evidence in support of most of his views and certainly they do not agree with my personal observation.

I had gradually grown to think that there was no intimate relation between tonsillitis and rheumatism, but the request of our secretary that I present a paper on the subject caused me to have an examination made of the records in my office of my private patients. Dr. G. W. Mosher has carefully looked over my case books and from these records, which include the histories of 1393 different patients who came to me suffering with acute and chronic tonsillitis, the histories of 100 acute cases have been taken without selection. An analysis of these seems to give a fair idea of the conditions that would obtain in all. Without selection, excepting as to age and sex which seem to be determining factors in many cases, we took 100 other control records of patients coming to me with other diseases for the purpose of ascertaining as nearly as might be the frequency of rheumatism not associated with tonsillitis.

Statistics on the etiology of diseases are frequently misleading on account of the absence of control cases; for example, if in 100 cases suffering from tonsillitis, we should find that there were 50 who had suffered from rheumatism, the customary way would be to conclude that rheumatism was the cause of the disease in 50%; whereas if in the 100 control patients, without tonsillitis, we should find that 50 had suffered from rheumatism, it would appear that 50% of all patients suffer from rheumatism and that, therefore, there is no relation whatever between the angina and the arthritis.

An examination of our histories revealed some other points of interest aside from the question under consideration. For example, nearly all of the patients had indoor occupations and 70% were males. Interesting figures also appear regarding the ages of the patients affected. Only one was less than 10 years of age and only one was over 50; 7% were between the ages of 40 and 50; 11% between 10

and 20; 26% were from 30 to 40 and 54% were between the ages of 20 and 30 years.

An analysis regarding the character of the inflammation shows 48% were follicular, 35% parenchymatous, 11% suppurative and 3% were ulcerative. In 3, the character was not stated. In 35%, there had been no previous attacks. In 11%, the patients were subjects of chronic tonsillitis; 9% had suffered from one or two previous acute attacks and 45% had suffered several or many previous attacks. This analysis yields no definite results regarding exciting causes of the disease, although 30% were attributed to colds.

It was found from this analysis that 45% of my patients who were suffering with acute tonsillitis were having at the same time, or had had previously, or had immediately following, an attack of acute rheumatism; whereas only 16% of the control cases had been similarly affected. This would suggest that 29% of all cases of acute tonsillitis are closely associated with some form of rheumatism and that in this proportion inflammation of the tonsils appears to be due to the same causes as rheumatism. However, as the term "rheumatism," in this analysis, includes muscular rheumatism, there is a possibility that in some of these cases the muscular pain may have been due to other causes.

Of the 45%, in whom rheumatism and tonsillitis had been in some way associated, 26 had muscular rheumatism and 27 had articular rheumatism, some of these having had both varieties of the disease. Some had the rheumatism before the tonsillitis, some at the time, and part following the arthritis; while others had the attack at two or more of these times. This analysis shows that only 5% had acute rheumatism immediately before the tonsillitis, that during or immediately following the attack of tonsillitis 8% had muscular rheumatism, and that 8% at these times had articular rheumatism. Thus only 13% showed any very clear association with the latter disease for what was termed muscular rheumatism was possibly simply the aching due to the angina.

The figures appear to prove that 45% of all cases of acute tonsillitis are in some way associated with rheumatism; that 29% have more than an accidental relation and that at least 13% are so closely associated with the latter disease as to justify the hypothesis of an identical cause. However, we must admit that they do not disprove a like etiological relation in the other cases.

Guerich, already quoted, believed that the removal of diseased tonsils would, in some cases at least, prevent the return of attacks of

rheumatism, and Adler advises the extirpation of tonsils that show the least indication of disease, apparently for the same purpose. In all these cases of acute tonsillitis, my records only show 11% that were affected with chronic disease of these glands, therefore I cannot agree with Adler that all tonsils showing the slightest evidence of disease should be removed; but I do believe that tonsils that frequently become inflamed, or enough enlarged to interfere in any way with the normal functions of the throat, should be excised or cured.

From this analysis I conclude: First, that I have gradually fallen into error regarding the relation of tonsillitis and rheumatism and that what has appeared to me merely casual is in fact due to an identical cause for the two in from 13% to possibly 29% of all cases of acute tonsillitis.

Second, 45% of the cases of tonsillitis have a rheumatic history, but 16% of other affections of the throat and chest also have a rheumatic history, so that not more than 29% of the cases of acute tonsillitis can fairly be attributed in any way to the rheumatic poison, and more than half of these are very doubtful.

Third, among my patients only 19% gave a history of previous attacks of articular rheumatism, and 18% a history of muscular pains that they ascribed to rheumatism.

Fourth, 8% of the cases of acute tonsillitis were attended by or immediately followed by articular rheumatism; the same number claimed to have had muscular rheumatism, while in 5% the rheumatic attack immediately preceded the angina.

Fifth, there is not, as yet, sufficient evidence to prove that the tonsil is the only or even the chief portal of entrance for the rheumatic poison. Considering, however, that, in all probability, acute articular rheumatism represents a mild type of septic hematogenic infection of the joints, there is no reason why the tonsil with its notorious facility for infection with pyogenic germs should not, possibly even frequently, assume the role of an infected wound leading to septic consequences of a systemic nature. These septic conditions vary in degree and location and rheumatism is perhaps one of the phenomena.

Sixth, the evidence does not yet justify the belief that inflammation of the tonsil may prevent (or take the place of) an attack of rheumatism.

Seventh, the statement that the acute beginning of muscular rheumatism is nearly always preceded by tonsillitis is not supported by

the histories of my cases, in only 2% of which did muscular rheumatism follow tonsillitis. However, in 6% muscular pains that were called rheumatism attended the tonsillitis, though they may have been due to the fever attending the inflammation of the tonsils.

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Congenital Atresia Naris. Report of a Case. GEORGE COHN. *Monatschr. f. Ohrenh.*, Berlin, Dec. 1904.

The author reports a case of unilateral bony atresia of the left naris near the choana, in a boy 10 years old. From a critical review of the literature of the subject, he arrives at the following conclusions: Sex has no influence on the frequency of this deformity. Half of the cases are bilateral, but in the unilateral cases the right side is more frequently affected. Seventy-five per cent. of the cases are associated with high-arched palate. Interference with breathing and feeding may cause the death of the patient during infancy, but, if the patient survives, mouth breathing and anosmia are the main symptoms. Operative treatment gives good results, but if the atresia is unilateral the symptoms are so slight that operation is not always necessary.

YANKAUER.

THE MOUTH, NOSE AND THROAT IN THEIR RELATIONS TO THE STOMACH AND INTESTINE.*

BY OTTO J. STEIN, M. D., CHICAGO, ILL.

My remarks will be restricted to the clinical relationship of the upper air tract and the gastro-intestinal organs.

If you but recall that the greater number of affections of the mouth, nose and throat are either local manifestations of some more general disturbance, as, for instance;

Laryngeal tuberculosis in pulmonary tuberculosis;

Mucous patches in syphilis;

Perichondritis of the larynx in typhoid fever;

Coryza in measles;

Angina in scarlet fever;

Paralysis of vocal cords in tabes;

Pharyngitis sicca in diabetes mellitus,

or that the regional disturbance creates or favors the introduction of other conditions, as a

Foreign body resulting in pneumonia;

Rhinitis resulting in erysipelas;

Septal ridges resulting in asthma;

Adenoids resulting in epileptic equivalents;

Diseased tonsils resulting in rheumatism;

then it will be seen that only a few remain as distinctly local affections, and you are at the same time more fully prepared to accept the cause and effect theory of respiratory and gastro-intestinal disturbances. But to designate in every instance which is the cause and which the effect is not possible. In many cases, a critical clinical observation shows the sequence of conditions. The same kind of mucous membrane and its continuity favor this. That both regions are the common highway for the introduction of chemical, thermal, microbic and parasitic irritation is another etiological factor. The intimacy of nerve and blood supply is also to be considered.

The association of the mouth, nose and throat affections with stomach and intestinal diseases has long been recognized, but owing to the division of the domain of medicine into its numerous

* A Paper Contributed to a Symposium on Gastro-intestinal Diseases, and read before the Chicago Medical Society, April 3, 1907.

special departments, there occurs not infrequently a neglect amounting at times to an absolute disregard for the other departments of medicine, so that too often we are looking with myopic eyes at a field whose confines are restricted by the anatomical boundaries of our chosen specialty, ignoring and forgetting that neighboring or remoter territories may influence or be influenced by our own.

As laryngologists, we are constantly called upon to determine the location of the cause of some symptoms like chronic cough; painful spot in the throat; hoarseness; dyspnea; dysphagia; nasopharyngorrhea; hyperesthesia; paresthesia; or a paralysis, and not infrequently our examination reveals a disturbance of the alimentary tract as the exciting or predisposing cause. The writer has observed cases of urticaria, herpes and angio-neurotic edema of the throat; acute laryngitis and chronic epiglottitis and laryngitis; acute pharyngitis and chronic naso-pharyngitis that have resulted from a disturbance of the digestive tract. Edema of the larynx in catarrhal inflammation of the bowels and also in cirrhosis of the liver has been reported by Schrötter, Schmidt, and Löri.

Take, for instance, the common canker of the mouth. Here we have the simplest and most frequent association of a disturbance of the digestive tract with the mouth. The same may be said of the coated tongue, stomatitis and the like. Although all of these conditions are commonly due either to changes in the salivary secretion, bad teeth, or a debilitated condition, in many the association with a disordered digestion is too patent to be ignored.

The acute pharyngitis so often observed at the commencement of typhoid fever, or the herpetic eruption of the pharynx, followed at times by deep and destructive ulcers, and the acute laryngitis followed in some instances by ulceration, perichondritis and paralysis, although not essentially the cause or effect of any bowel lesion that is present, but the association of the two conditions as manifestations of the same disease, become of common interest and importance to both the laryngologist and internist. An epistaxis occurring on successive days in a healthy adult, excepting for slight fever, or an attack of acute pharyngitis, are oftentimes the signal of an impending attack of typhoid.

The vomiting that may accompany chronic gastritis causes a passive hyperemia of the mucous membrane of the throat, and so does the regurgitation of dyspepsia. A faulty diet with its attending digestive disturbance may induce a lithemic condition that will often call forth most annoying and persisting nose and throat symptoms,

and if the digestive disorder is recognized as the promoting factor and corrected, the distressing rhinitis and pharyngitis are immediately relieved. Beverly Robinson has been frequently quoted as saying that the butyric acid and other products of gastric fermentation and putrefaction aggravate catarrhal states of the upper air tract.

In atony of the stomach and bowel, we have a condition favoring the absorption of toxic material, which becomes the irritating agent in the production of catarrhal changes of the mucous membrane. Nervous dyspepsia at times reflects itself onto the upper respiratory tract in the form of a hyperesthesia, paresthesia or paralysis. An overloaded stomach may give rise to spastic laryngeal symptoms, probably reflexly through the vagus. Spasmodic croup in children is frequently relieved by an emetic. Worms in children producing irritation of the intestines provoke or at least aggravate catarrhal manifestations of the nose and throat.

Chronic constipation may cause a hyperemia that ultimately results in thickening of the mucous membrane of the pharynx and larynx. Some of the large varices seen at the root of the tongue are produced by the same condition. There is a variety of constipation, many times present in anemia, wherein the collection of "clinkers" of fecal material constitutes the characteristic features. In these cases it is not uncommon to find nasal or laryngeal symptoms which are relieved whenever the inspissated masses are removed.

I have found that the presence of indican in the urine in excess has furnished me invaluable information as to the cause of many otherwise intractable cases of catarrhal conditions. Hence it is my practice in such cases to ascertain the functioning condition of these organs, and if they cannot easily be corrected by simple but judicious measures, they are placed in the hands of the internist who can correct them, and it is astonishing with what salutary results.

I wish to direct particular attention to two diseases of the digestive tract whose influence is felt in the upper air tract. The first in an atonic state of the stomach and bowels. The weakness of the expulsive forces that constitutes such atonic condition causes a dilated stomach and bowel, which results in the accumulation of food and gases, and the gradual increasing size of the organs causes pressure upon the blood vessels and nerves and displacement of neighboring organs, so that a true splanchnoptosis may result. It is in this class of cases that a chronic naso-pharyngitis is oftentimes found that will defeat every effort at treatment unless the

cause be recognized, and the patient referred to one conversant and skilled in the correction of such disorders.

The second condition that I desire particularly to draw your attention to is that of malignancy of the esophagus. In its early stage symptoms referable to the throat are at times complained of. The symptoms are either pain on swallowing or paresthetic sensations that are referred only to the fauces or pharynx. Personally, I have been led to a correct diagnosis of cancer of the esophagus by just these symptoms in several cases. The lack of this knowledge was the cause of my not recognizing the first case. In three cases there was no obstruction to the passage of food or drink. The pain is referred to the tonsils and root of the tongue, while the pain in malignancy or tuberculosis of the larynx is, as a rule, referred to the ears. I consider this symptom of such great value that in anyone complaining of painful or paresthetic sensations in the tonsillar region or at the root of the tongue, and in whom no positive local condition can be determined, or that is not purely hysterical, as strongly presumptive of beginning malignancy of the esophagus.

Thus far my argument has been directed to a presentation of some gastro-intestinal causations of upper respiratory affections. That reciprocal causative factors reside in the latter region is just as true.

In individuals affected with the raspberry-like enlargements of the posterior end of the lower turbinals, in the edematous swellings of the posterior nares, and in the disease known as Thornwald's disease, there is commonly a superabundance of thick, viscid secretion which, owing either to a repugnance on the part of the patient to hawk out, or an impossibility to do so, is swallowed, ultimately inducing such gastric symptoms as nausea, vomiting, gastralgia, and flatulency, which results in loss of appetite, irregular eating, and a perverted diet, so that these patients soon assume the additional burden of some true pathological disturbance of the gastro-intestinal tract.

In the presence of a chronic purulent disease of the nasal accessory sinuses, particularly the sphenoid and posterior ethmoidal cells, there is added to the abundant acrid secretions of the simple catarrhal affections the element of infection. In chronic empyema of the sphenoid sinus, with or without an associated nasopharyngeal atrophy, the purulent secretion can be seen trickling down the side of the pharynx from above, and passing into the esophagus.

The influence that nasal obstruction has upon the blood in lessening the number of red blood corpuscles and lowering the percentage of hemoglobin and the return to a normal condition after correction of the nasal difficulty, has been demonstrated by D. Braden Kyle, Schadle, and others. To my mind, the importance of this in the production of nutritive changes in the body is great, and may explain the origin of some of the digestive disturbances. If nasal obstruction reduces the red blood corpuscles and the hemoglobin, then there follows a lessening of blood oxygenation and a retention of carbonic acid gas, and as a consequence tissue metamorphosis is retarded, and as the excitability of the nervous and muscular tissues of the body depends upon a continuous and generous supply of oxygen, interference with the same induces among other conditions impairment of the assimilative processes.

I wish but to direct your attention to the physiological relationship of the sense of smell to stimulate appetite and digestion. When the sense of smell has been abolished by hyperthrophic changes or destroyed as in some other cases, like atrophy, the sense of taste is perverted, and as a consequence the craving for food or its enjoyment is lacking, and a state of malnutrition can easily follow which is usually attended by a variety of symptoms referable to the gastro-intestinal tract.

Friedrich refers to the frequent association of dyspepsia with atrophic rhinitis and pharyngitis due, he avers, to swallowing of the fetid secretions.

The diseased faucial tonsil has come into considerable prominence of late as the cause of a host of body ills. But it can scarcely be disputed that a tonsil whose large crypts are filled with quantities of foul-smelling and multi-bacteria-laden secretion is not favorably located for the squeezing action of the muscles of the throat, which carries the contents of the crypt into the pharynx, where it mixes with the food, and thus contributes to the production of fermentive changes in the stomach or aggravates a pre-existing condition therein by providing the infecting material. Several observers (Turck and Stucky) have investigated the bacterial relationship of these two regions in affections occurring concomitantly, and their findings indicate a cause and effect.

Many of these diseased tonsils require the most scrutinizing examination to disclose the existence of any trouble. The gland may be small and present no signs of redness or cryptic involvement, until it is rolled out from behind the anterior faucial pillar, and its

numerous crypts are explored with a fine probe. This is particularly true as to the supratonsillar space, and especially so when the plica triangularis is over-prominent and hypertrophied. Large cavities or dilated crypts filled with pus emptying into the throat through an apparently normal-looking crypt opening have come under my observation, the abundant purulent secretions having been swallowed and having set up profound digestive disturbances as well as septic symptoms. Several workers have directed attention to the association of suppurative disease of the tonsil with attacks of appendicitis, suggesting something more than a coincidence of affections.

Mycosis leptothrícia is especially noted by some observers (Richardson and Ingals) as being associated with gastro-intestinal disturbances.

Another variety of the mycosis, in which its parasite, *sarcina ventriculi*, has been actually found present in the stomach (Good-sire, 1842) associated with the condition in the oral cavity and pharynx, is the mycosis *sarcinica*.

In a third variety of mycosis known as actinomycosis, Abbe reports a case located in the esophagus secondary to its appearance in the mouth.

In a fourth variety—mycosis *mucorina*—Sendziak reports Paltauf, of Vienna, as having observed a case with enteritis and peritonsillitis. The patient died after fourteen days and the phlegmon showed the parasite, *mucor corymbifer*.

In mycosis *soorina*, known also as thrush, we have a variety of mycosis common in the mouths of infants, and not infrequently it is associated with digestive disturbances.

The implication of the esophagus in any of the mycoses, according to Sendziak, is, as a rule, one of continuity of tissue from the mouth. Nevertheless, primary cases have been reported in the esophagus (Mackenzie) and the stomach (Zalesky).

In pulmonary tuberculosis the question of reinfection from the swallowing of the sputa is reasonably established.

Affections of the teeth and gums occupy a conspicuous position in the causative relationship with gastro-intestinal disturbances, but the subject is entirely outside my province to discuss.

100 State St.

CONSIDERATIONS RELATIVE TO NASAL OBSTRUCTION.*

BY A. E. PRINCE, M. D., SPRINGFIELD, ILL.

My purpose in choosing such a broad title as "Considerations Relative to Nasal Obstructions" is to put together some thoughts which have a general bearing on the whole subject, without attempting to exhaust any particular phase. The abstract of my paper is embodied in the following questions, an endeavor to answer which will be made in as brief a manner as consistent.

First: What is the cause of the prejudice regarding tonsil operations, and what is the remedy?

Second: Why do some operators frequently have failures in adenoid operations?

Third: Why do many operators use the cautery and snare in treating inferior turbinal enlargement?

Fourth: Why does any one attempt an operation for nasal polypos in the middle meatus without removing the middle turbinates?

Fifth: Why does any one ignore the relation of the accessory sinuses in the consideration of nasal obstruction?

Sixth: Why does any one attempt the handling of a malignant growth unless he is inclined, in emergency, to open and curette or cauterize with the thermal cautery, the remotest corner of any one of the accessory sinuses?

I am convinced that the prejudice against tonsillectomy which prevails is due to the slipshod methods which have prevailed in the past. It has seemed such an easy matter to slip a tonsillotome over an enlarged tonsil which is not submerged, and is free from palatal adhesions, that many of the doctors of the land have indulged in this unscientific method, and in most of the cases left behind a considerable portion of the tonsil.

When one thinks that the reason these organs are hypertrophied is because of the fight which is being waged on the part of nature, on the one hand, in her effort to destroy the invading microbes, and the microbes, on the other (being tubercular in 10 per cent of the cases), in their effort to involve the system, the futility of cutting in two the barrier wall becomes at once apparent. Further, the operator who is responsible for the prejudice, has been in the habit

* Read before the Eleventh Annual Meeting of the American Academy of Ophthalmology and Oto-Laryngology, St. Clair, Mich., August 30, 31 and September 1, 1906.

of ignoring adenoids, hypertrophied turbinates and deflected septums. He has promised good breathing, and the result has been weighed in the balance by the public, and found wanting. Ten good operations will not balance one failure, and as long as physicians perform incomplete operations, prejudice resulting from failure will continue to exist.

To facilitate the removal of the tonsil, it is essential, in the difficult cases, to separate the pillars which may be adherent to the tonsils. The patient is placed on a chair or table, preferably a Yale chair, which can be so tilted as to incline the body head downward sufficiently to let the blood flow out when the face is turned to the side. The chair is raised *ad maximum* and the operator sits on a low stool so that his head is as low as that of the patient. An original O'Dwyer gag is preferred, since its curve permits it to be inserted on the right side of the mouth, permitting the largest space for the introduction of the left fore finger into the naso-pharynx. A good operation for nasal obstruction means a comprehensive



Fig. 1. Author's Tonsil Scissors.

grasp of the situation, and the removal of all the causes of obstruction, whether it be the tonsils, adenoids, turbinal enlargement or septum deflections. In the practice of the author all these operations excepting those for deflections are done at one time, and to accomplish this, much depends on position, instruments, anaesthetic, etc., which will be briefly considered.

A combination scissors and separator is here offered, which has been found efficient in the author's hands. After grasping the tonsil with an efficient forceps, it is first inserted under the anterior pillar, and the blades separated. Next, the palato-tonsillar membrane is divided, and the incision is carried down behind the tonsil, separating the posterior pillar. The tonsil may then be dissected out down to the fauces with such scissors as may meet with favor at the hands of the individual operator.

The adenoid operation is next undertaken.

Many operations for the removal of adenoids have failed because they are done with a large curette—and without digital co-operation.

This is illustrated by cases in which a nodule of adenoid is found anterior to the vomer.

The operator who attempts the operation with a Gottstein's curette or adenotome, will fail to reach such portions. A case comes to mind in which a child had two operations, both under an anaesthetic, without result. Upon digital examination, a remnant was found on each side anterior to the posterior line of the vomer, which could only be reached with a narrow curette or a forceps.

As a matter of fact, the curette has been almost discarded in favor of a type of forceps which is here exhibited.

Another reason why adenoid operations are often unsuccessful is the timidity which prevails regarding the use of a general anaesthetic.

An operation which is done without an anaesthetic is often unworthy of the name. If the result were open to inspection after a Gottstein's curette had been thrust into the pharyngeal vault of a frightened child, the surgeon would consider himself disgraced.

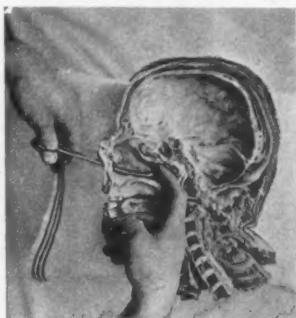


Fig. 2. Adenoid Forceps.

In these operations we must attain 100 per cent of success. The man who exonerates himself by claiming that he told the truth nine times out of ten is to be compared with the doctor who congratulates himself for having had 90 per cent of success in adenoid operations. The 5 or 10 per cent of the partial failures may seem very small, but the physician owes it to every individual child that is brought to him suffering from oxygen starvation, to provide capacity for complete aeration. This can only be accomplished by the use of general anaesthesia, especially in children. Here a word is *apropos* regarding the use of an anaesthetic. It matters little whether it be chloroform or ether or ethyl bromide. The main point is that the operator must overcome timidity, for no operation requires more profound anaesthesia than those on the throat and nose. Timidity can only be overcome by the establishment of confidence in some quick, simple, always-at-hand method of resuscitation of suspended animation. The method recommended is the direct inspiration. This is accomplished by extending the head, press-

ing on the stomach with the left hand, closing the nose with the right, placing the operator's mouth over that of the patient and blowing the latter's lungs full of freshly inspired air. Repeat this every three seconds. The ashen or livid lips will assume a normal color, and may be maintained so indefinitely. Commence this whenever respiration lags, and you will soon gain the confidence in the method which is essential to success.

Regarding the use of the cautery, chemical or galvanic, in the treatment of turbinal obstruction, it is my belief that better results are obtained by the method of excision. An examination of the nose in a condition of intumescence will reveal the fact that there is an amount of mucous surface in excess of that required to cover the inferior turbinate bone. At the posterior end this is distended by the accumulation of blood until quite a balloon is formed, which



Illustrating the method of crowding the hypertrophied posterior portion of the mucous membrane of the inferior turbinal between the branches of the forceps.

After grasping, rotate forceps to the right for the right side. The left forefinger is inserted, and not the right, as exhibited in the illustration, which was made necessary by the conditions of photography.

alternately expands and contracts. The principal symptom is the alternating obstruction of one side or the other. . .

The treatment of these cases by the cautery method destroys the epithelium, and leaves a membrane which adds little moisture to the air in passing. Submucous cauterizations do not give the lasting benefit derived from excision. The cauterization of the posterior end of the inferior turbinate has proved so unsatisfactory that the majority of operators resort to the snare.

The application of the snare requires the use of cocaine, which contracts the vessels, and defeats the very object one wishes to obtain. The shrinking of the erectile tissues prevents the application of the snare, and at best, but a small strip of mucous membrane is

removed, insufficient to effect a complete relief from the symptoms of obstruction.

This difficulty was experienced by the author about twenty years ago, at which time he designed a forceps for the removal of the hypertrophied redundant tissue along the lower edge and posterior end of the inferior turbinate. The forceps was given a concavity on the biting edge corresponding to the curved surface of the inferior turbinate. On the convex surface, it was left open so that it might grasp firmly the tissue and bite through the membrane. It was made very strong, so that if a portion of bone was found to reach quite near the floor of the inferior meatus, it would cut it away and establish a free meatus, it being the design to remove whatever fell into the grasp of the forceps. The instrument has not been very popular owing to insufficient knowledge regarding its manipulation, as well as to defects which have resulted in efforts to cheapen the construction. To be efficient, the hinge should have a strong reinforcement on both sides, or else the coaptation of the edges will be imperfect.

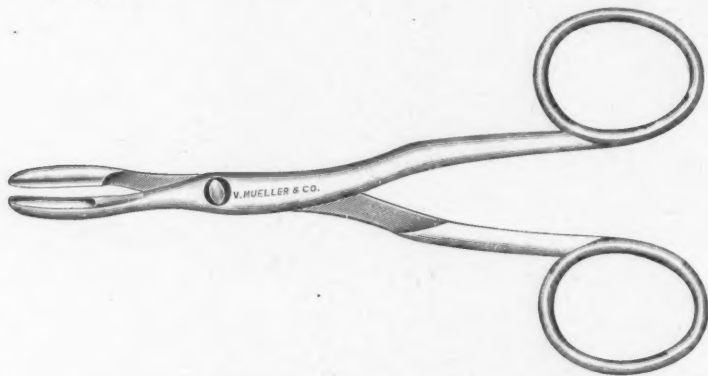


Fig. 3. Author's Middle-Turbinal Forceps.

In view of the fact that it has been in daily use in the author's hands for this long period, with almost universal satisfaction, it may be permitted to repeat a word regarding its manipulation. To get the best results, the patient is under the influence of ethyl chloride or chloroform, to escape the contraction of the vessels which attends the use of cocaine. He is placed partly on the right side with body inclined head downward.

The instrument is inserted into the inferior meatus with the biting edge down. When the advancing end has reached the posterior extremity (see cut) of the inferior turbinate, it is turned so that the

concave surface is in contact with the free surface of the inferior turbinate. At this point, the blades are opened, and the rotation is continued, which brings the inferior blade under the lower edge, when it is closed, and secures the redundant soft tissue, and perhaps a narrow strip of bone along the free lower border. Before clos-



Illustrating the third position of the inferior and post-turbinal forceps, showing that it grasps nothing in a normal nose with mucous membrane contracted. If hypertrophied or relaxed, it will remove a strip the length of the lower margin of the inferior turbinal. This strip is removed by rotation of the forcep.

ing, the forefinger of the left hand inserted back of the palate, presses the soft post-turbinal tissue into the grasp of the forceps. In this manner a strip is secured, extending the entire length of the inferior turbinate, and representing the amount of tissue that

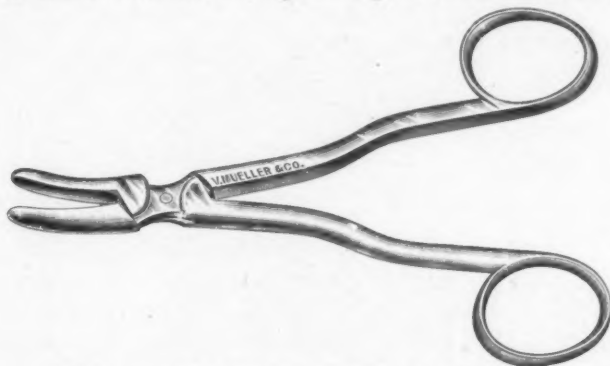


Fig. 4. Forceps for Bridges between Septum and Inferior Turbinal.

can be spared, and still leave enough to cover the remaining inferior turbinate bone. The handles are then taken in the hollow of the hand, and squeezed ad maximum. If the edges are sharp, they will

cut almost through the tissue. At this point do not pull, but continue the rotation and push the forceps into the pharynx until the strip is loosened.

There will be considerable hemorrhage, which usually ceases spontaneously. I avoid packing or inserting a plug or splint, although occasionally use a compressed sponge, and saturate it, when in position, with a drenalin solution. Some attention must be given to bridging. The use of a bulb ear syringe, and normal salt solution, three times a day by the patient, will usually complete the cure.

This operation has been done by the author more than one thousand times, and the minimum of trouble at the time or later has made this instrument and method regarded with great favor.

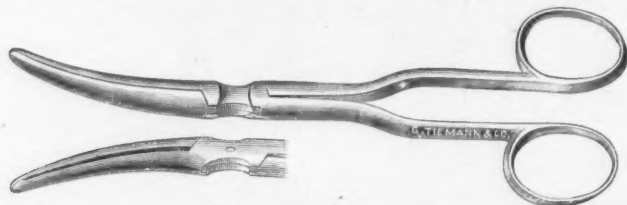
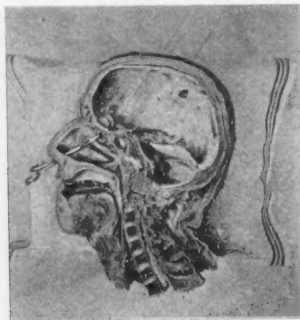


Fig. 5. Forceps for Post-Turbinal Hypertrophy.
POLYPUS IN THE MIDDLE MEATUS.

In answer to the question regarding the removal of polypi in the middle meatus, it should be acknowledged that in the past no operation in surgery has been less efficient. These polypi usually arise as



Illustrating the operation of the superior turbinal punch, for exposing the naso-frontal duct and permitting the removal of the ethmoidal cells, by the intra-nasal route.

a result of secretion from the frontal sinus or ethmoid cells or maxillary sinus. The secretion irritates the membrane, and causes it to proliferate. This further interferes with the escape of the secretion, and results in a development of polypi which usually originates at

a point which cannot be reached without the removal of the middle turbinal, and the exposure of the hiatus semilunaris.

It has been the authors' lot to work in this field before Luc and Grünwald produced their instruments, to facilitate work, and it may not be without profit to exhibit an instrument which has served many years in the removal of the middle turbinate, and at the same time all the polypi which infest the region, short of opening the sinuses.

This forceps is called "middle turbinal or bridge forceps." The use of this instrument entirely supplants the snare, and it is believed that it has sufficient merit to make it worth a trial.

A further thought regarding nasal obstruction is the turgescence due to diseases of the accessory sinuses, sight of which must not be lost. This may be illustrated by reference to a case of polypus. The growths prevailed on both sides, and were removed together with the middle turbinates, under a general anaesthetic. On the right side, the obstruction was entirely removed, but on the left, it was found that the patient could not breathe well. This was partly accounted for by the fact that the septum encroached on that side, but the main source of the obstruction was found to be due to the secretion from the frontal sinus, which kept the entire mucous membrane in swollen condition. Persistent pain was complained of over the left frontal region. It was decided to insert a gold drainage tube into the sinus, after the Ingals method, which was done. This rendered the discharge free, and under improved drainage, the quantity diminished, and the character improved. Free drainage or a radical operation is recommended as a remedy for the swelling, which may prevail in conjunction with the empyaemia of the accessory sinuses of the nose.

In closing, it seems desirable to say a word regarding the obstruction due to malignant growths. During the past year, three cases have presented, which have served to modify my opinion on this subject.

First, that of Mrs. S., age 30, a bleeder, suffering from complete obstruction due to a growth in the right side of the nose. Several attempts had been made to remove the growth, but nothing was accomplished on account of the alarming hemorrhage. The history led to the belief that it was a malignant growth, and the fact was explained to the husband. An operation was undertaken with faint hope. It was found to be a soft sarcomatous growth, filling the maxillary antrum, having completely obstructed the inferior and middle meatus. Owing to the profuse hemorrhage, the operation

was made as rapidly as possible, and the cavity packed. In a month the nose was filled with the same growth, and respiration, which, after the operation, was free, was entirely obstructed.

Believing that the X-ray would be useless in such a case, it was recommended purely to postpone the fatal sentence. To my surprise, in two months the patient developed a breathing space which increased from day to day, until the growth entirely disappeared, and today she is a well woman.

Second: Mrs. H., wife of Dr. Hubbard, of Virginia, Ill., developed a growth on the left side, which proved to be a round-cell sarcoma, involving the vomer and palate bones.

Stimulated by the recovery of the former case, the use of the X-Ray was assiduously persisted in. Extensive necrosis continued, until the case was regarded as hopeless. At this stage, cleft existed in the palate; the entire septum was destroyed, and part of the externa of the nose. After returning home, the use of the X-Ray was continued by Dr. Carl Black, of Jacksonville. She greatly improved, but was not satisfied. About the time the necrosis was under control, she sought aid from Christian Science, and is now, I understand, entirely well.

Third: Mrs. N. presented an obstruction to breathing on both sides. Diagnosed by microscopic section as sarcoma.

The tumor involved the septum, which necrosed extensively. The growth was radically removed, and cauterized with galvano-cautery. X-Ray treatments were commenced, but did not at once control the progress of the necrosis. After six months of close observation, however, the case made a complete recovery.

In the past, I have relinquished these cases after a feeble fight against what seemed an unmerciful destiny, but since having my experience of success in the last three cases, I shall in the future put up a more vigorous fight with the most improved X-Ray coil.

On six occasions, I resorted to galvano-cautery, which, I am very sure, was essential. This makes it impossible to estimate the degree of importance to be attached to the X-Ray, but is my conviction that without these two remedies, the results would have been fatal.

If the sinus is involved, one should consider himself in the position of a drowning man, and fight the enemy with cautery and X-Ray after freely opening and curetting the sinus or sinuses, which may be involved.

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PERITONSILLAR ABSCESS.

BY CHARLES M. ROBERTSON, A.M., M.D., CHICAGO.

This disease is described by different authors as Peritonsillar plegmon, Phlegmonous tonsillitis, and Quinsy. It is seldom a disease of the tonsil itself, as it usually affects the tissues surrounding the gland. It is a result of an infection in the supra-tonsillar space from decomposition of material squeezed out of the crypts which empty their contents on the superior surface of the gland. It is accompanied by systemic disturbance and great pain. It may be coincident with infective fevers, especially scarlet and typhoid. It may assume different forms according to the location of the pus as determined by the anatomic relation of the parts. Thus we distinguish a proximal, ventral, dorsal, lateral, or a combination of any of these forms.

If, upon examination, we find a swelling which forces the tonsil distalward, we should be justified in thinking the pus was situated in tissues proximal to the tonsil, a proximal abscess. If the tonsil is pressed dorsalward, the pus will lie between the tonsil and the anterior pillar, a ventral abscess. If the tonsil is pushed ventralward, presenting well into the mouth, we find the pus dorsal to the gland, a dorsal abscess; while, if the tonsil occupies a position toward the medial line, we know the pus is lateral to the tonsil, a lateral abscess. It is possible to have a proximo-ventral, proximo-dorsal, proximo-lateral, ventro-lateral, dorso-lateral, ventro-distal, dorso-distal, or a latero-distal abscess.

In cases where pockets or sinuses exist around the tonsil we may have a lateral or distal abscess, which, by burrowing of the pus along the muscles of the neck and the cervical fascia, may produce a subglottic abscess. The author has observed such abscesses which ruptured into the trachea. Death has occurred in such cases from suffocation or from aspiration pneumonia.

Etiology. Suppurative inflammations such as we are considering may result from an infection of the tonsil which has occurred as the result of bacterial infection from the mouth or naso-pharynx. In most cases, however, the author believes peritonsillar abscess the result of an infection in or about the tonsil itself, caused from decomposition of caseous masses thrown off from the crypts of the

tonsil. There is often thickening of the pillars from recurrent tonsillitis, or the pillars become attached to the gland by inflammatory adhesions. This produces closure of the opening between the supra-tonsillar fossa and the pharynx. This condition of closure may also be caused by hypertrophy of the faucial tonsil. Destruction of the supra-tonsillar space by hypertrophy of the faucial tonsil will produce the same result by the openings of the supra-tonsillar crypts pressing against the junction of the pillars.

In all cases examined by the author of those who had experienced peritonsillar abscess, the presence of cheesy masses in the superior crypts of the tonsils (*THE INFECTING CRYPTS of the author*) could be demonstrated. In many cases it was difficult or impossible to gain an entrance into these crypts on account of *a*, the hypertrophy of the gland destroying the supra-tonsillar space; *b*, the adhesions of the pillars to the top of the tonsil; *c*, the presence of the plicatonsillaræ, which in many cases is persistent and covers the entire top of the gland.

I have seen many cases who had one, two or more attacks of Quinsy yearly, and in each instance crypts were found to contain greater or less quantity of this cheesy material. I have arrived at the conclusion that such abscesses are caused by infection from this extruded material in the crypt itself, or in the supra-tonsillar fossa, undergoing decomposition with pus formation. Even cases beginning as a follicular tonsillitis I believe are so caused, the follicular tonsillitis producing an inflammatory condition in the part which helps in the production of a favorable condition for the decomposition of these masses and the absorption of the poison thus produced. This is borne out by observation, as we see follicular tonsillitis cases pass the active inflammatory stage and then suddenly the abscess develops after the follicular disease has disappeared. If this space were cleaned out early, the abscess would not develop.

Pathology. The pathology resolves itself into an infection produced by the retained caseous material being decomposed, which produces an infection in the part, characterized by a true inflammatory process, with heat, redness, swelling and pain. There is an increase in the quantity of blood in the part, with extravasation of serum, then leucocytes and abscess formation. The lymphatics under the tongue and jaw and in the cervical chain take up the infection, becoming swollen and painful. The suppurative process is limited only by the amount of infection taken up by the lymphat-

ics and the character of the poison. A deep-seated infection must of necessity be more profound than a superficial one, because it is retained more closely and the consequent accumulation of pus is therefore greater. Much also depends on the character of the infecting material. We frequently find an lateral abscess much larger and therefore containing more pus than an ventral quinsy.

Symptoms. Preceding abscess, we usually have an acute inflammation of the tonsil in the form of follicular or lacunar tonsillitis. This condition lasts from a few hours to three or four days. The patient first complains of a dryness in his mouth and throat. There is a distinct rigor, followed by chills, aching pains in bones and muscles, particularly in the muscles of the back. They complain of headache, constipation, scanty urine, loss of appetite, with fever of high degree, often reaching 104-106° F. The tongue is covered by yellowish gray or brown material. The pain is severe and worse upon attempting to swallow, when it radiates into the ear and over the side of the neck. Inability to open the jaws is a marked symptom of this disease.

As the disease progresses, the tissues become very red, swollen and edematous, especially the palatal arches and uvula. The epiglottis and rim of the larynx may be affected, and in such cases there is great danger to breathing from this condition, as well as from the fact that the soft palate sometimes becomes so large and elongated that it may drop into the larynx, producing stenosis of the laryngeal aperture.

After the first few hours, the dryness gives place to an excessive flow of secretion, which adds to the discomfort of the patient. The breath becomes offensive, breathing more difficult, and swallowing more painful.

On account of the swollen tissue and inability to open the mouth, it is difficult to get a view of the parts. When possible to palpate the swelling, it has a hard, tense feel, which may exist even when abundant pus is present. The swelling of the tissues may extend into the walls of the post-nasal space and cause occlusion of the Eustachian tube orifice, producing acute otitis media. The swelling varies from the size of a hickory nut to that of a lemon. Pus may extend into the crypts of the tonsil, breaking down the gland which may form a part of the abscess cavity. The abscess usually ruptures or is evacuated in a few days, when the symptoms rapidly disappear.

Should there be tissue necrosis, we may have a destruction of or rupture into the Eustachian tube, causing a suppuration of the middle ear, or, by contraction of tissues after rupture of the abscess, leave a constricted Eustachian tube. The walls of the larger vessels may be weakened by extension of tissue necrosis extending backward and outward, and aneurism of the internal or external carotid produced. One case of aneurism of the internal carotid came under the observation of the author from this cause. In this case the physician examining the swollen mass, which was supposed to be a recurrent quinsy, was shocked, after he had introduced a tongue depressor to examine the swelling, to see the patient gag and the blood gush out of the mouth till death came in a few seconds. Thrombosis of the internal jugular has been reported as a sequel of this form of quinsy. If none of these complications occur, the tonsil is left inflamed and the pillars adherent and thickened.

The cause is not removed unless the tonsil becomes a cicatricial mass as a result of the abscess formation, or is enucleated, which, of course, precludes the possibility of recurrence of the disease.

Diagnosis. The diagnosis is not difficult when based upon the clinical findings. It might be confused with syphilitic gumma or malignant tumors, but the symptoms will easily differentiate between these diseases. If in doubt, we can easily make the diagnosis clear by the use of the knife or exploring needle. We should note the previous occurrence of the disease, the pain in the muscles of the back and limbs, pain and difficulty of swallowing, inability to open jaws, high temperature, involvement of lymphatics and swelling, and duration of the disease. When pus is present, fluctuation can be determined, care being taken to tell that it is pus and not an aneurism. One would hate to plunge a knife into an aneurism and see his patient die before he could do anything to prevent it.

Treatment. Should we see the case early enough, the cleansing of the supra-tonsillar fossa would avoid the attack. After the disease is established, free catharsis, salicylates pushed for ten or twelve hours will do much to relieve the pain and reduce the temperature. Hot salt solution as a gargle continued for some length of time will do something to reduce the edema, as will a gargle of adrenalin. Cocain proves distressing to many and is of little value on account of its depressing action on the heart, even when used in weak solution. Draining the abscess by a liberal incision is of the utmost importance and should be done thoroughly. The

exact line of incision depends upon the form of abscess presenting. The abscess cavity should be broken down if divided and irrigated at the discretion of the surgeon.

After the attack has passed, the tonsils should be enucleated, which insures against the recurrence of the disease.

It is absolutely necessary to take *all* of the tonsil out, as ordinary operations of decapitation done by means of the tonsillotome will not suffice. After the tonsils are removed, a search should be made for the existence of pockets in the tissue of the soft palate between the pillars, and if such be discovered they should be destroyed by the removal of the medial wall or surface.

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Intermittent Nasal Obstruction. L'ESTRANGE (Roma, Queensland.) *Austral. Med. Gaz.*, Oct. 20, 1906.

After pointing out the physiologic role of normal nasal breathing, the author dwells particularly on the fact that patients frequently complain of dry cough, irritation, and loss of voice, with a tendency to coryza, headaches, morning hebetude, tonsillitis of mild character and sometimes bronchial troubles, yet only careful examination will determine that there is mouth breathing at night only.

One or both turbinals may show a groove which corresponds to some projection from the septum, but more often one must depend for diagnosis on the morbid state of surrounding parts, combined with the patient's statements and admissions, i. e., the small adenoid spots on the posterior wall of the pharynx, the congestion of the laryngeal mucous membrane and of the vocal cords, etc. "If the patient be directed to fasten up his mouth and chin at night by means of a suitable apparatus, either an amelioration of the symptoms and conditions follows or he complains that he is unable to sleep."

To operate on a nose apparently normal requires a certain amount of assurance as to result. Nocturnal obstruction once recognized is easy to remove by the ordinary methods for rendering the nasal fossæ free of all mechanical prevention of normal breathing.

EATON.

TREATMENT OF ATROPHIC RHINITIS WITH STRONG SOLUTIONS OF NITRATE OF SILVER WITH MASSAGE.*

BY GEORGE F. KEIPER, A. M., M. D. LAFAYETTE, INDIANA.

That the proper treatment of atrophic rhinitis is one of the great problems yet unsolved by the rhinologist goes without question. In fact, Dr. George L. Richards, in a paper before the Section of Laryngology and Otology of the American Medical Association, last summer, at Boston, characterizes "Atrophic Rhinitis a Reproach to Rhinology." Further, the multiplicity of remedies proposed and after a trial discarded, is evidence also for the statement. We seem to be far from a proper solution of the therapeutics demanded.

In this brief paper, I bring you my experience after fourteen years of practice.

At the outset we must recognize, if possible, the cause of atrophic rhinitis, and ask ourselves, What is atrophic rhinitis?

In this discussion, we will purposely omit such causes as syphilis and confine ourselves to its local treatment, recognizing in all cases where needed the value of internal medication to meet general conditions involved. Moreover, we will not use the word "cure" unless qualified by the word "symptomatic"; that is, it may be impossible to restore the nostrils of the sufferer to their former normal condition and function. We will be content to rid the patient of the dreadful fetor and crusts. If we can cause reproduction of bone and mucous membrane, we will count both as so much more gained than we had hoped. It is easy to tear down, but it is quite a different problem to build up structures in the human body.

Its etiology may give us some clue to its treatment:

Three bacterial formations have been found in these cases, namely, the Pneumococcus, Cocco-bacillus foetidus of Pertz, and the Bacillus mucosus of Abel. These bacteria are resistant to ordinary antiseptics in such strength as we are accustomed to use them.

In the August number for 1899 of the Annals of Otology, Rhinology and Laryngology is an article which covers thirty pages by Professor V. Cozzolino, of Naples, who discourses extensively and learnedly therein upon "The Bacteriology and Histology of Ozena." He concludes thus:

"My conclusion is that the bacillus mucosus is the etiologic factor in the production of two of the most disagreeable *symptoms* of

* Read before the Southern Section of the American Laryngological, Rhinological and Otological Society, Louisville, Ky., February 25, 1907.

ozena, viz.: fetidity and crusts; but it is by no means to be classed as the specific etiologic agent of ozena, as I maintained in the discussion of the bacteriologic etiology of ozena at the International Congress of Otolaryngology in Basle in 1884. The etiology of the bone atrophy, and, in consequence, of the mucosa, also, can be found in the nutritive alteration of the tissues of the turbinate bodies or of one turbinate body. This change begins in the bone and is often associated with a congenital, general, systemic disorder. I wish to emphasize the fact that the ozenous patient is born *ozenous*; that is to say, the child, which afterwards suffers with the full manifestations of the ozenous affection, comes into the world with a special predisposition for these nutritive changes, which determine as erosion of the bone and its ultimate destruction and atrophy of the mucosa of the turbinate bodies."

We have, then, two etiologic factors: (1) the bacterial, and (2) the hereditary predisposition.

First, let us examine the work of Cozzolino from the bacterial side. In all forty-two cases which he examined for bacteria he found the bacillus mucosus. However, in his experiments relative to germicides preventing its growth, the strongest solution of nitrate of silver used was 2%, and with no results. In fact, with the long list of antiseptics used, only four proved efficient, viz.: trichloroacetic acid, 100%; trichloride of iodine and corrosive sublimate in from $\frac{1}{2}$ to 1% solutions, and creosote, 4%. He seems to think that a solution of nitrate of silver stronger than 2% is not tolerated by the nasal mucous membrane. As oculists, we know that in gonorrheal conjunctivitis of the adult, or the ophthalmia of the newborn, we sometimes use as high as 4% solutions of nitrate of silver to the everted conjunctival surfaces of the eyelids, and with good results.

Attracted by the work of Abel in 1893 and the advice of Meyjes, as given in the second edition of McBride (1894), the writer began the use of very strong solutions of nitrate of silver to the nasal mucous membrane, beginning with a 12% solution and carrying the treatment up to a 30% solution. However, instead of simply applying it to the nasal mucous membrane, as Meyjes recommends, the writer proceeded to *rub it vigorously into the nasal mucous membrane as far as possible, at the same time exerting a tapping motion*. In other words, the general principles of massage are applied to a special field.

This brings us to the second point in etiology, the (2, Hereditary Predisposition. Whether it be true or not, one thing is certain,

the bone and overlying mucous membranes atrophy. The query is pertinent—can these structures be encouraged to grow? Massage has demonstrated its value in other organs of the body in producing growth, and why not in the nose. Hence, proceeding on this assumption, the writer has combined two treatments into one, namely, massaging nitrate of silver into the nasal mucosa. The organic silver salts have been tried and found wanting. In all cases a few applications suffice to cause the odor to disappear and the mucous membrane to take on a more healthy aspect, due, no doubt, in a great measure to the disappearance of the crusts and the stimulation which the silver solution, plus massage, produces. And often are we gratified to find the nose fill up with a regenerated turbinal and overlying mucosa.

The method of procedure is as follows: The nasal mucous membrane is thoroughly cleansed of all crusts and the best solution to use in the atomizer is the warm normal saline solution. It may be necessary to dislodge some by the cotton tipped applicator and some may need to be picked out with the ordinary ear forceps. Then a twenty-five per cent solution of cocaine is carefully applied to the mucous membrane with a cotton tipped application. This is done but once. After waiting awhile for anaesthesia a 1:1000 solution of adrenalin chloride is likewise applied if a tendency to bleeding exists. The adrenalin is not absolutely necessary, as the nitrate of silver is hemostatic. The nose is then dried. The 12% solution of nitrate of silver is then applied on the cotton tipped applicator by rubbing and vibratory massage by hand. There is no particular advantage in the machine invented for that purpose. Nature has better equipped us. Then the nose is sprayed with the camphor menthol solution given below. The patient is given directions as to how to cleanse the nose with the warm normal saline solution, which is poured into the nose either by a tablespoonful or the little glass douche, or with the Dr. Vibiss irrigator, introducing the little tube well into the nostrils. Every hour during the day time he or she sprays the nose with the following:

R Mentholis
 Camphorae aa,gr. XXX
 Misce et adde.....
 Olei Eucalyptigtt. XXX
 Glymolis̄IV

The patient returns to the office every other day until the fetor has disappeared and then twice a week, and as time progresses the solution is made stronger until a 30% solution is reached.

